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Ungermann-Bass adds fiber-optic local net

By Lynn Haber
CW Staff

WASHINGTON, D.C. — In a move to cover all bases in the local-area network arena, Ungermann-Bass, Inc. took the wraps off a fiber-optic, Ethernet-compatible local-area network at last week's Communication Networks Conference & Exposition here.

The result of a joint marketing agreement with Siec Corp., maker of Siec Fiberlan, a fiber-optic transmission subsystem, Fiber Optic Net/One is an expansion of Ungermann-Bass' existing baseband and broadband systems. It was designed to bring to local-area networks such fiber-optic features as noise immunity, secure transmission and the ability to communicate over longer distances.

With the addition of an optical fiber local-area network to its product line, Ungermann-Bass is effectively allowing users to select the medium or combination of media most appropriate to their application, a spokesman claimed. By using either network bridges or repeaters, users can interconnect baseband, broadband and optical-fiber Net/One systems, he said.

Targeted primarily at users who want to extend the transmission range of an installed, coaxial, carrier-sense multiple access with collision detection local network or users who need to install a network that provides high reliability under adverse environmental conditions, Fiber Optic Net/One is available in single- or multiple-cable configurations and operates at a 10M bit/sec data rate.

Net/One network interface units use electro-optical transceivers to provide the transmission interface to the optical fiber medium, the vendor said. This interface reportedly meets the specifications of Xerox Corp.'s Ethernet and employs access methods and collision detection signals functionally identical to those used

See NETWORK page 10

Satellite service set by Hewlett-Packard

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Hewlett-Packard Co. and Vitalink Communications Corp. last week announced a satellite-based voice/data private network service priced substantially below competing terrestrial microwave facilities. The joint venture marks the entrance of processor maker HP into the increasingly competitive telecommunications market.

The satellite service, available immediately, allows HP 3000 users to bypass the telephone network and communicate with

each other through earth stations supplied by Vitalink and satellite channels provided by Western Union, Inc.'s Westar IV satellite. The software needed to interface the HP 3000s to the Vitalink earth stations has already been developed, according to a Vitalink press release issued here last week at the Communication Networks Conference & Exposition.

An HP spokesman noted that because the HP 3000 can emulate IBM processors, users of IBM mainframes can also transmit voice and data over the satellite network.

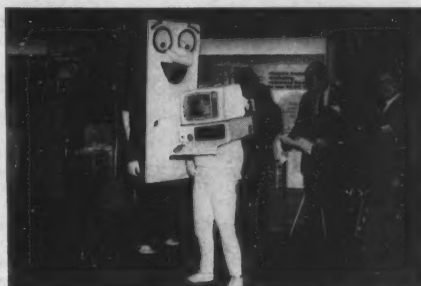
The network will provide a two-way 56K bit/sec channel for \$1,800/mo, according to George Ward, president of Vitalink, a three-year-old company partly owned by Western Union and General Electric Co. "The conventional microwave link used for this purpose typically costs \$8,000 to \$9,000 a month," Ward noted.

However, there will be some additional charges. The user must either buy an earth station costing \$120,000 per site or lease one for \$2,000/mo. There is also a one-time charge of \$20,000 for the HP interfacing software.

HP representatives will be the user's initial point of contact for the satellite service; they will sell and lease the Vitalink facilities

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CW AT COMNET



CW photo by L. Haber

Comnet '84 attracted a variety of visitors.

TOP OF THE NEWS

Storage Technology Corp. has failed for the second time to expand its product line into the processor field. This time it killed a project to develop a high-performance, IBM-compatible mainframe. Page 2.

A workstation with limited artificial intelligence that lets DP novices communicate with host processors in a nontechnical vocabulary was unveiled by Microdata Corp. Page 2.

President Reagan is asking more for federal R&D but less for the National Bureau of Standards' DP standards program. Page 6.

The Accunet Packet Switched Service will be available nationwide by year-end, an AT&T spokeswoman said last week. Page 11.

Will supermicros kill off 16-bit minicomputers? A recent study suggests they will. Page 63.

Although it was officially announced only two weeks ago, Apple Computer, Inc.'s Macintosh has already spurred announcements of compatible software. Page 73.

By John Gallant
CW Staff

OLYMPIA, Wash. — When it came time for Stanley Slynghsted to order up a round of beers at Charlie's Tavern here, he always outdid the other patrons by buying the quart-size bottles.

Slynghsted liked attention, said bar manager Jim Silva, and he always had lots of money to spend and to loan to other customers who were down on their luck. Unfortunately, the money wasn't his.

State police said that between April 1982 and March 1983, Slynghsted, an information supervisor for the state's Department of Social and Health Services, used the agency's Sperry Corp. Model 1100/82 mainframe to issue himself some \$17,000 in fraudulent payments.

State Police Lt. Ed Crawford said the Olympia native designed the computer program that issued the funds. According to Crawford, Slynghsted had the checks made out to one Stanley Lyngsted at his home address — the missing letter in his surname designed to throw auditors off the trail.

Crawford said Slynghsted was thorough about destroying computerized evidence of

his wrongdoing, but he overlooked the canceled checks, which investigators seized upon as evidence.

Slynghsted was arrested and pleaded guilty to first-degree theft. But he claimed he had given all the stolen money to the broke and unemployed patrons of Charlie's Tavern.

Instantly, bartender Silva said, the media seized on Slynghsted as "a Robin Hood of the computer age." The tavern was besieged by writers from local and national newspapers and by television crews, including ABC and NBC.

At his sentencing last July, Slynghsted told Thurston County Superior Court Judge Hewitt Henry that he could "fill the courtroom" with the people who had benefited from his ill-gotten gains. The judge was not impressed. Telling reporters he was not at all pleased at playing the role of Sheriff of Nottingham, Henry sentenced Slynghsted to the maximum 10 years in prison.

Speaking last week from the Cedar Creek Corrections Center in Little Rock, Ark., Slynghsted said he decided to finagle with the state computer only when his own funds

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NEWSPAPER

NEWS

STC drops mainframe plans, cites tech, cost problems

By Peter Bartolik
CW Staff

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has terminated a project to produce and market an IBM-compatible mainframe computer because of technological problems and increasing cost estimates.

The Jan. 26 announcement that STC is ending work on a mainframe that, in the words of a company spokesman, proved to be "not a complete computer" was the second time in 16 months STC abandoned major hardware development efforts it had planned to expand its product line beyond storage systems.

The mainframe project was announced three years ago [CW, Jan. 19, 1981] under joint agreement with the newly formed Storage Technology Partners, with planned shipments in early 1984 of a high-range mainframe using Cmos technology, with expected performance rates of three million to 14 million instructions per second. Reportedly, some \$70 million had been raised since then to fund the effort.

The recent announcement marks the second failure by the mass storage producer to extend its product line into the processor field. Less than two years ago, STC announced it had abandoned development of the Virtual Storage System (VSS), a backend processor, or data base machine, that had been announced one year earlier [CW, Aug. 9, 1982].

Kenneth Bosomworth, industry analyst and president of International Resource Development, Inc., told *Computerworld* that STC's mainframe development program may have stemmed from overconfidence resulting from the company's broad market penetration with magnetic storage products.

"Probably, [STC] should not have gone into [mainframes] to begin with," Bosomworth said. "I think they were tempted into it because they have such good customer accounts [with] monthly billings in the hundreds of thousands and even millions of dollars. They probably figured, why not produce mainframes as well and take IBM out [of those accounts] completely?"

"It must have been tempting from the market-access standpoint."

Bosomworth added that development of both the mainframe and the earlier VSS may have diverted resources that could have been put to

better use. "You only have a limited amount of engineering talent and resources to spread around," he said, adding that STC may have been better off "protecting their strong areas in magnetic storage and, perhaps, optical storage."

In a brief statement announcing the end of the mainframe development effort, Jesse I. Aweida, chairman of STC, said the termination was unavoidable. "Delays in completing the development program have reduced the likelihood of successfully marketing the mainframe computer," Aweida said. Continuation of the project would have risked further delays and called for substantial additional funds, he added.

STC Vice-President Ronald B. Weinell told *Computerworld* a number of factors went into the decision to cancel the project. In particular, recent tests showed "the computer was functioning and performing complex tasks, but was not a complete computer." He said 15% to 20% of the mainframe's very large-scale integration chips "were not performing" up to expectations.

The company had only recently informed the 200 to 300 investors in Storage Technology Partners that the expected shipment date of the mainframe had been put back to late 1984, Weinell said.

He added that STC management felt "the potential for successfully marketing the product was slipping" and expected costs to complete the project were significant. Asked if IBM's aggressive pricing and product announcement strategies were a factor, he replied, "We anticipated that the longer it took us to [produce the mainframe], the more we would be in direct competition with them."

Weinell would not comment on whether the company plans in the future to concentrate on storage technology or to try again to expand its product line into other areas.

The company, which has experienced losses for two straight financial quarters, said the canceled project should produce a substantial write-off in the fourth quarter and "add to the losses from ongoing operations expected for that quarter."

STC expects to terminate 400 employees who had been involved in the project. Weinell said that despite layoffs of 400 in October 1982 and 500 in March 1983, employment levels had just about climbed all the way back up before the announcement.

Microdata workstation features limited AI

By Jeffrey Boeler
CW West Coast Bureau

LOS ANGELES — Microdata Corp. last week extended its product line downward with the introduction of an intelligent workstation that reportedly provides limited artificial intelligence and allows computing novices to communicate with central processors in a nontechnical vocabulary.

The Microdata 1000 was designed to operate either in stand-alone mode or as a terminal linked to an IBM or Microdata host computer. The workstation is packaged with Natural Language, an inquiry-processing software module that enables the workstation to "learn" new user words or commands as it discovers them, according to a Microdata spokesman.

For example, if the 1000 encounters a word not previously included in its data dictionary, a definition is requested, and the response is used to update its lexicon. When it encounters the same word again, the workstation grasps the meaning immediately, the spokesman said.

Natural Language also allows the 1000 to draw logical inferences from incomplete or unclear user inquiries and to adapt itself automatically to differing styles of personal expression. If, for example, a query is only partially decipherable, the product interprets the command as best it can and then asks if its interpretation is correct, the spokesman said.

Natural Language interfaces users to the relational data base management system already residing in the 1000's Micro-Reality software, a previously unavailable subset of Microdata's existing Reality control program.

Micro-Reality is bundled in the 1000 with two other operating systems: Convergent Technologies, Inc.'s Ctos and Microsoft, Inc.'s MS-DOS. Ctos allows the workstation to run a family of Convergent-developed applications, while MS-DOS enables the machine to support Microdata's Multiplan spreadsheet package.

All the Convergent-written programs are decision support tools for office automation and allow the workstation to perform applications like word processing, business graphics, electronic mail and project-scheduling tasks.

With the introduction of the 1000, Microdata's product line now con-

sists of four software-compatible systems capable of supporting one to 208 concurrent users. The other three members of the company's product family include the Reality small business system, the Sovereign distributed processing system and the Sequel 32-bit large business system.

Works as stand-alone or terminal

Built around Convergent Technologies' Ngen intelligent workstations, the 1000 can operate either as a stand-alone unit or as a system terminal linked to an IBM mainframe or to a larger Microdata processor. To permit communications with IBM CPUs, the Microdata product optionally supports the 3270 bisynchronous transmission protocol or can operate in a Systems Network Architecture environment, the spokesman said.

The 1000 also can be interconnected with up to three other Microdata workstations to form a local network in which all constituent terminals can share hard disk storage, printers or similar systems resources.

In a typical local network, one of the nodes acts as a master and is equipped with at least one 10M- or 20M-byte hard disk unit. The other three workstations, meanwhile, serve as satellites and support 5¼-in. floppy disk modules, each holding up to 630K bytes.

With its Intel Corp. 80186 microprocessor, the 1000 operates at 8 MHz, three times faster than the IBM Personal Computer. Microdata claimed it incorporates a bit-mapped display with 720- by 348-pixel resolution, quadrupling the pixel density of the Big Blue product. The workstation also holds up to 1M byte of main memory and as many as four 10M- or 20M-byte hard disk units, for a total external storage capacity of 80M bytes.

In a basic configuration, a master Microdata workstation, designated the 1000/40, incorporates a 12-in. display, 512K bytes of main memory, three operating systems and a 10M-byte disk unit.

The 1000/40 costs \$8,075. With the hard disk excluded, the system becomes a satellite 1000/10 configuration, which costs approximately \$4,000.

Both workstation versions will be available for shipment during the first quarter from Microdata at 17481 Red Hill Ave., Irvine, Calif. 92714.

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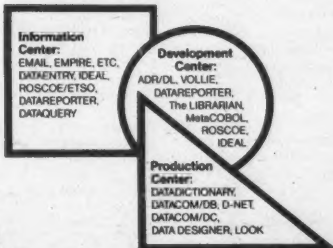
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NEWS

Cost of Cobol generator pays off for small user

By Paul Gilpin
CW Staff

TAMPA, Fla. — For a small programming installation like that at Duval-Bibb Co. here, a \$30,000 investment in a programmer productivity tool is a major expense. But the magazine distributor's DP department decided the expense was worth it after estimating that the tool would increase productivity by the equivalent of two to three staff members.

Duval-Bibb became one of the first users of Computer-Aided Programming (CAP), an intelligent code generator from Netron, Inc. of Toronto that runs on Wang Laboratories, Inc. machines. CAP employs reusable Cobol code and a functional programming concept called a "frame" to incorporate separately compiled and linked subroutines and custom-coded code to significantly cut down on the time required to develop applications.

CAP uses a fill-in-the-blanks approach and a sophisticated full screen editor that enables programmers to avoid much of the mundane coding that is required to generate routine applications, according to DP staff members at Duval-Bibb. The product also allows programmers to break out of the frame to add custom code where needed. Users can design their own frames and save common subroutines for future use.

Used in all development

At Duval-Bibb, CAP was installed on a Wang VS90 last spring and is now used in all new development, according to Leslie Feasey, manager of information systems. In addition, the software is used extensively to regenerate modules of code that are scheduled for routine updates and maintenance.

In one case, programmers regenerated an entire application using CAP after they figured it would take only 1½ days longer than the 26½ days scheduled for updating the program. The program, a data-entry application that updates six files at once, "is one of the real nasties in the library," Feasey said.

In addition, the staff has developed two major projects using CAP, which together incorporate nearly 20,000 lines of code. CAP is best for standard programs like report generation, data entry and file management, Feasey said.

"It's very fast," he commented. "In the past we've budgeted five days for a reasonably sized report program, including design, test and documentation. With CAP, the coding and testing portion virtually disappeared. Three days worth of work collapses to less than half a day."

Creating a standard report involves writing "very little code," ac-

cording to Rick Deland, a programmer/analyst. "The main thing you do is go into the report description, lay out the report as you'd like to see it, define the screens, and that compiles into a frame. Then you change a few parameters and it compiles," he maintained.

Because CAP uses pretested, canned subroutines, applications are easy to modify, Feasey noted. "You just put a break in a routine, write

the code and recompile," he said. "It adds most of the hooks."

For Duval-Bibb programmers, the CAP full screen editor is the product's most useful feature. Using a scrolling feature, the editor can accommodate screens of up to 100 lines, can edit a screen at a time and can display all error messages at once, Deland said. "It allows you to display a file or run a program while you're still editing a file," Deland said. "You can also tell it in what order you want fields to be edited."

CAP has also reduced the need to write working storage code. "In the past, a pretty complicated report program involved laying out a lot of working storage," Deland said. "In CAP, the working storage that relates to the file is done for you. You're not involved with working storage in most cases."

The screen editor is "head and shoulders above the Wang editor," said Fred Mortimer, a senior analyst. "You can lay out and modify a screen in 10 to 15 minutes."

The CAP environment section presents multiple directories on a single screen. A programmer can call up a screen by positioning the cursor next to the screen name and can use up to 32 programmed function keys to make standard changes. "We've been able to go in and rearrange an 18-column report in less than a day," Mortimer said. "Any screen generating I've done in the last six months, I've done with CAP."

Some reservations

Programmers noted that CAP is still not appropriate for most large applications. "It has real trouble with update programs," Deland said. "You still have to write about 90% of the code from scratch."

"In the real heavy computational program," Feasey added, "you end up writing most of the code by hand. You only save 20% to 30% of the time."

Staff members also pointed out that while a programmer can be productive on CAP after only three days of training, proficiency takes a good deal longer to achieve. "It's easy to get started, but even after six months you're still learning," Feasey said. "Learning it thoroughly is fairly complicated."

Developer touts coding ease

TORONTO — "First and foremost, it is a manufacturing technique applied to building software."

That is how principal developer Paul Bassett describes CAP (Computer Aided Programming), a Cobol code generator from Netron, Inc.

Bassett, who is vice-president of software manufacturing at Netron here, said CAP differs from the "black box" approach of many commercial application generators in that the code which it generates can easily be modified.

Bassett said he has worked with application generators but found "it was necessary to get in to tweak it with things like file drivers and device I/O. Once you've done that, you can't go back and recompile because you'll blow all the hours of hand coding."

As a result, he believes many shops continue to hand-code modifications and updates produced by application generators because they fear recompiling.

CAP is based on the belief that most of the routines contained in common programs have been written before. "Our experience is that only about 10% to 15% of a program is actually new code," Bassett said. "Procedures like file openings and

closings, ends of file, all the boilerplate code of handling a file can be written down in a 'frame.'"

CAP provides a library of standard application-independent frames ranging from simple abstract data types to frames that create complete, multiple records per screen and interactive file maintenance programs. Users can add their own frames as well.

To build an application, the analyst answers prompts on a specification menu. The system pieces together the code modules and provides "hooks" into other subroutines.

Bassett characterizes the CAP generator as a software engineering methodology in which the machine rather than the programmer follows the methodology. "All the code that makes the program unique is centrally maintained," according to Bassett. "Thus, the maintenance can be performed at the specification level."

Unlike many application generators, with CAP "you always have the ability to work with the source code," Bassett said. "You don't have to accept blindly what it does for you. You can always override it."

Fast coding job lauded

TORONTO — A computer science student at Canada's University of Waterloo says he developed a 34,000-line Cobol application in three weeks using a code generator developed by Netron, Inc., a software company based here.

Michael Rehkopf last year developed the application for Canadiana Outdoor Products, Inc. of Toronto using Netron's Computer Aided Programming (CAP). Rehkopf was working as an intern at Netron at the time.

Rehkopf had three months of experience with CAP and a single Cobol course under his belt when he was tapped by Netron to develop the project. The application for Canadiana allows orders to be

placed for standard office and factory supplies. It produces requisitions, performs authorization checks, posts orders to accounts and prepares reports.

"Most of the work I did was laying out screens. CAP generated all the code," said Rehkopf, who is now in his third year at the university. After he left Netron, a new programmer was able to come in and make major modifications to the application in about a week, he said.

"The important thing is that when you want to fix or change a program, you're not looking at 34,000 lines of Cobol," Rehkopf commented. "You're only looking at 2,000 to 3,000 lines of custom code."

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NEWS

Execs: 3270-PC won't displace 3270 terminal

By Paul Korzeniowski
CW Staff

Will IBM's 3270 Personal Computer render obsolete its own 3270 series of terminals? The answer to that question is "probably not," based on recent *Computerworld* interviews with DP managers and industry analysts who believe functional limitations and cost will prevent corporations from replacing 3270 series terminals with 3270-PCs.

"When the 3270-PC was introduced, I thought it would provide the mainframe link that corporate users desired," said Ron Goldfarb, manager for office automation at Pratt & Whitney Aircraft Co., based in Hartford, Conn. The microcomputer apparently did not fulfill this need: "A user can access mainframe data, but it isn't easy to use that data with Lotus Development Corp.'s 1-2-3 or other microcomputer applications [software]."

The problem is caused by the incompatibility of mainframe and microcomputer data formats. IBM mainframes store data in Ebcidic format; Personal Computers use Ascii format.

Converting mainframe data for microcomputer applications is a tedious process. A user who wants to do so needs the proper software and temperament. First, he must load and run one of the micro-to-mainframe links which reformat data in one of the seven windows available on the 3270-PC. (Visicorp's Visianswer, Management Science America, Inc.'s Peachlink and McCormack & Dodge Corp.'s PC Link are three products that provide this type of link.) Next, the user must store the reformatted data on the microcomputer note pad icon which is used to transfer data between applications running in different windows. After he has utilized the data in the appropriate applications, he has to reverse these steps to send the file to the mainframe.

Windowing capability

The 3270-PC can load microcomputer software in seven windows, four of which can be used for mainframe applications. It is this windowing capability that separates 3270-PCs from 3270 terminals — a distinction for which users pay dearly, according to Dale Kutnick, executive director at The Yankee Group, the Boston-based market research firm.

"IBM would be happy if everyone replaced 3270 series terminals with 3270-PCs," Kutnick said. "The 3270-PC costs approximately three times as much as a 3178, the least expensive 3270 series terminal. Since terminals are used primarily for data entry, window capabilities are really not needed. [Data entry] department managers could not justify the cost of the 3270-PC."

Higher costs do not stop with the stand-alone system. "Since the 3270-PC does not have multiplexer capabilities, it needs its own line to communicate with the host," Kutnick pointed out. "Communication costs would rise significantly if one replaced terminals with these microcomputers."

While the 3270-PC does not offer financial benefits to data processing managers, it will help IBM's bottom

line. The 3270-PC represents Big Blue's latest attempt to protect what it perceives as its turf — data processing departments in large corporations. "IBM is tightening its open architecture, so it can have more control over the market," said Will Zachmann, vice-president of corporate research for International Data Corp., a market research firm in Framingham, Mass. "The 3270-PC is not aimed at the terminal market but at those trying to sell to the IBM corporate marketplace."

The micro, industry analysts say, was designed to keep computer retailers away from IBM accounts. Re-

tailers like Entre Computer Centers, Inc. and Computerland Corp. packaged non-IBM products, such as terminal emulator boards, with IBM Personal Computers and called on IBM accounts that wanted a mainframe link. Since the retailer — not the IBM sales representative — could provide it, retailers sold huge quantities of IBM Personal Computers to IBM mainframe installations.

IBM kicked up its heels, limiting 3270-PC sales to its account representatives and designing the new system in such a way that upgrading from an IBM Personal Computer to a 3270-PC is not realistic. "IBM's ratio-

nale is that a mainframe link requires more than just a microcomputer," Kutnick said. "It requires communications capability, software and system-specific items. Its sales force understands those needs."

Because of its high cost and limited functionality, analysts predict small numbers of sales for the 3270 Personal Computer.

However, industry observers do predict continued growth in the 3270 series terminal market. "The 3270-PC does not mean the death of 3270 series terminals," Kutnick said. "There is a need for data entry functions. It is a viable market."



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NEWS

White House seeks jump in R&D but cuts for NBS

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration asked for a 14% increase in federal research and development support in the fiscal 1985 federal budget sent to Congress last week. Total R&D funding would reach \$63 billion, a \$6 billion increase over this year's request.

The budget document emphasized a "high priority" for "R&D that is appropriate for federal support." In contrast, the administration continues to seek cuts in programs it wants the private sector to support, particularly the National Bureau of Standards' (NBS) Institute for Computer Sciences and Technology (ICST), whose funding would be cut 50% to \$5 million under the Reagan plan.

Currently financed at approximately \$10 million a year, the ICST program includes monies for the federal DP standards program and several computer research projects. It is the standards program the administration has sought to thrust onto the private sector. Congressional opposition, however, has so far kept this program within NBS.

In the overall 1985 Reagan budget, totaling \$925 billion, support for basic R&D would increase 10% from \$7.2 billion to \$7.9 billion, which the White House estimated would equal a real growth above inflation of about 6%.

The \$63 billion requested for total R&D funds emphasizes Defense Department programs and the programs of the National Science Foundation (NSF). NSF is tasked with strengthening engineering research and training

and providing better access for scientists to advanced computer facilities.

Funds for NSF-supported R&D programs would rise by about \$170 million, or 14%, to more than \$1.4 billion in 1985. These funds are primarily aimed at supporting research in academic institutions through project grants emphasizing, among other things, engineering and better university research instrumentation.

The administration said it will provide special funds to increase access of academic scientists to supercomputers, providing not only computer time and technical support but also support for communications, equipment and other costs for remote access by scientists at their university laboratories.

Specifically, the NSF mathematical and physical sciences program, which includes access to computing facilities and research in computer science, such as new computing methods based on parallel processing and new mathematical structures and techniques, would receive \$417 million in 1985, up from \$359 million this year.

The NSF engineering program, which supports work to increase U.S. capabilities in such areas as computer and systems engineering, would be financed at \$147 million, up from \$121 million in 1984, under the Reagan budget. The bulk of federal R&D funds are slated for Defense Department programs, which include a number of programs in computers, semiconductors and electronics. Defense R&D funds will total \$33.9 billion in 1985, a \$6.2 billion, or 23%, increase.

For MIS execs, data base details micro software

By Jeffrey Beeler
CW West Coast Bureau

WALNUT CREEK, Calif. — A marketing services firm has applied high technology to one of MIS management's newest but most vexing problems — the rapidly growing volume of end-user requests for information about microcomputer software packages. What it has come up with is a nationwide telemarketing service that provides on-line access to a central data base that reportedly describes thousands of personal computer programs.

Targeted mainly at business users in large corporations, the data base contains reviews, evaluations and general descriptions of each of the products listed in its software catalog. Also included with each item in the One Point Electronic Catalog is information about pricing, warranties, support and maintenance, according to Stevan Clouttree, president of privately held ITM, the service's founder.

To gain access to the data base, a user dials ITM's phone number through a local modem and enters a password with his terminal keyboard; the user can either browse through the data base contents or conduct structured searches for specific kinds of packages.

"Each product in the electronic catalog is coded with up to 10 subject identification codes, much like a library's Dewey Decimal system," Clouttree said. "So a user can search the data base by product name or publisher. In addition, if a subscriber wants, for example, an MRP program that interfaces with a particular accounts payable package and runs on a [Texas Instruments, Inc.] machine, he can string codes together to structure the search for exactly what he wants."

If a user finds a package that meets his needs, he can flag the appropriate item in the data base, enter his address and other shipment information and order the product. After paying a one-time setup fee of \$100, the customer will receive a copy of the requested program through the mail within a few days, Clouttree said.

Because it has its own source of supply and ships software in large

volumes, ITM can typically make its products available to subscribers for discounts ranging from 20% to 30% or more, he added.

Since it went into operation in mid-December, the One Point service has already attracted roughly 200 subscribers, many of them large corporations like PepsiCo, Inc. and Exxon Office Systems Co., Clouttree said. Information systems managers reportedly account for an estimated 40% of the electronic catalog's total user base.

"What we're finding in our market studies is that MIS managers are being inundated with requests to research software packages and advise users about which microcomputer program they should buy," Clouttree said. With One Point, they can quickly gather large amounts of information about many competing packages and then narrow the range of options down to four or five finalists. A key advantage of ITM's electronic catalog is that it can be easily operated by technically unskilled employees.

Echoing Clouttree's comments about One Point is one of the service's users, Joe Nicholson, who recently left the New York-based software and consulting firm of Monchick-Weber Corp. to form Belvedere Microsystems, Inc. As a Monchick-Weber consultant, Nicholson found the electronic catalog "extremely valuable," primarily because of the extensiveness of the service's product data base.

"One Point gave us the opportunity to examine many software packages in a single source and find out what's currently available on the marketplace," Nicholson recalled. "We could never have learned about such a wide variety of products from computer stores, which usually offer only one choice of each type of package."

Based on a Compupro Systems, Inc. 816 microcomputer running Digital Research, Inc.'s MP/M operating system, One Point's data base currently lists some 3,500 packages, including the best known spreadsheet, word processing, graphics and other business-oriented microcomputer programs. An additional 1,260 titles are scheduled to be added to the catalog within the next 30 days or so.

Chemnet may be marketed

By David Myers
CW New York Bureau

NEW YORK — Chemical Bank may change from user to vendor by offering its telecommunications network capabilities to the merchant market later this year.

James Mayer, senior vice-president of telecommunications, confirmed last week that the bank is studying the possibility, but said a decision is in "the discussion stages" and still "months away." Yet to be answered are questions of security, product quality and regulation, he said.

If Chemical Bank does decide to plunge into the networking mart, it could provide electronic mail and ap-

plications-level capabilities with access to any of the distributed nodes on its already installed Chemnet, according to Mayer. This could ultimately mean an entrance by the bank into the time-sharing business.

Chemnet, planned three years ago, was completed for internal use in mid-1983 and incorporates a network architecture that in some cases was ahead of what IBM, Digital Equipment Corp. and Wang Laboratories, Inc. were able to offer it, Mayer said.

"We've worked along with the vendors and replaced the household stuff as soon as products were ready. Our approach is to standardize. That's what... makes the [network] product marketable," Mayer said.

Sperry posts earnings increase

NEW YORK — Citing improved earnings in each of its operating units, Sperry Corp. last week posted an 84% increase in earnings on a modest 1% jump in sales for its third quarter.

Profits totaled \$74 million, or \$1.42 per share, compared with \$40 million, or 90 cents per share, the

same period a year ago. Sales totaled \$1.8 billion compared with \$1.7 billion a year ago.

Sperry attributed its earnings jump to increased sales volume in its defense and aerospace operations, lower interest expenses and "continuing cost-cutting measures throughout the company."

CORRECTIONS

"DEC unwraps Ultrix-32" [CW, Jan. 23], which stated that Digital Equipment Corp. was the second major firm to introduce a Unix-based operating system, should have stated that DEC was the second major firm in recent weeks to introduce a Unix-based operating system. Several other major vendors have announced versions of Unix.

"Ingres update offered" [CW, Jan. 9] incorrectly stated the version number of the new release of Relational Technology, Inc.'s Ingres data base management system. The correct release is Version 2.1.

The last line of the address of the Mumps Users Group was inadvertently omitted from an article in the Jan. 23 Software and Services section. The full address is Suite 308,

4321 Hartwick Road, College Park, Md. 20740.

The correct price of Caleshare, Inc.'s CSI-X.25 Data Concentrator [CW, Dec. 12] ranges from \$2,735 to \$4,195 for four- to 16-port configurations.

CGA Software Products Group, Inc.'s Single Image Software Version 7.1 is an enhanced version of the software that is now available for IBM MVS/XA, not a new product as indicated in "Utility Offered for MVS/XA" [CW, Dec. 26-Jan. 2]. Also, the correct lease prices are \$675/mo per site for Multiple Systems Integrity Facility; \$450/mo each for Multiple Systems Manager and Global Console Director; and \$1,575/mo per site for the three together, known as Single Image Software.

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2. FINE-FEATHERED FEATURES. SyncSort CMS liberates programmers. Using the program's full range of features, you can often produce a simple report in one day rather than five. These can do the following:

- Select relevant records;
- Reformat records on output;
- Perform summaries of designated numeric fields;
- Produce reports with pagination, headings, dates.

3. GREATER VERSATILITY. SyncSort CMS is a bird for all seasons:

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NEWS

Vault takes page from Brinks

By John Gallant
CW Staff

ATLANTA — Laurence Murphy thinks data should be treated the same way Brinks, Inc. handles money. So when the vice-president of the armored car company failed in 1981 to convince his peers at Brinks that the time was ripe to enter the information security marketplace, he joined forces with real estate investment specialist Richard Ornstein to establish the Vault Co. here.

The Vault, according to Murphy, is the first facility to offer "complete off-site data protection," which he said includes guaranteed physical security and environmental safety, in addition to the Vault's software source-code escrow service. The Vault's data library was built to store as many as 100,000 computer tapes inside a concrete-and-steel structure, which, Murphy claimed, can easily withstand any natural disaster.

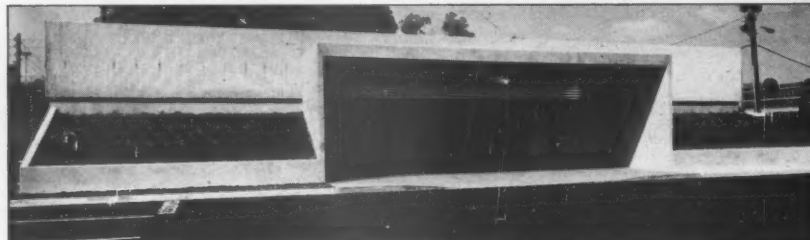
Murphy said it costs clients an average of \$1 per disk each month to store computer tapes in the Vault's data library. Considering the value of the data stored on those tapes, he said, that expense is minimal.

Asked what makes the Vault different from other data storage and disaster recovery facilities, Murphy replied, "Most of these so-called off-site facilities are nothing more than warehouses. We

provide total physical and environmental security, in addition to escrow services you could only get from a bank before. We are a trained third party equipped to provide complete data security and disaster recovery services."

According to Murphy, the data library is watched over by closed-circuit television monitors and bonded security guards behind bullet-proof glass. Only a trained data librarian utilizing a computerized tape retrieval system has access to the tapes stored in the library, which is both temperature and humidity controlled and equipped with a Halon fire-protection system. Clients must undergo a signature-matching process to verify their authority to take delivery of tapes.

In addition to magnetic tapes, the Vault was designed to house data stored in hard copy, hard disk packs, diskettes, microform, microfilm and cassettes. Clients can transport their media to and from the facility via the Vault's own environmentally controlled vans, which maintain constant temperature and humidity levels. Constructed of more than 3.6 million pounds of concrete and steel, the Vault incorporates physical security techniques recommended by experts at IBM and the Federal Reserve Bank, Murphy said. A mobile storage system in the data library utilizes tape racks that move along rails built into the concrete floor.



The Vault's concrete-and-steel structure can withstand any natural disaster.

Source: The Vault Co.

Source code held in escrow

ATLANTA — Shortly after the Vault Co. began offering off-site data protection in August 1982, Laurence Murphy was approached by representatives from three Atlanta-based software manufacturers: Datatrak, Inc.; Catronix, Inc.; and Computer Communication Specialists, Inc. The firms asked Murphy to devise a source code escrow service that would protect their clients in the event that any of the firms were forced out of business.

With the assistance of the accounting firm of Deloitte Haskins and Sells and the Atlanta-based legal firm of Hurt, Richardson, Garner, Todd and Cadenhead, the Vault drew up a standard escrow agreement. The agreement stipulates that each software company would deposit with the Vault a copy of all source codes and any updates to the code it developed for users.

The Vault maintains the source codes in its secure environment and notifies users on receipt of updates from the vendor. The Vault will release the source code to the user if any of the following circumstances arise:

- The Vault receives a letter from a software company's accountant stating that the company is no longer doing business.

- The software company and the user sign a joint agreement for the release of the source code.

- The Vault receives a court order from state or federal authorities authorizing release of the source code.

Begun last October, the escrow service was initially restricted to the three original firms and their users until the Vault's management was certain all bugs in the program were resolved. Now, Murphy said, the Vault will aggressively market the escrow service nationwide.

Banks linking fingerprint scanners to terminals to foil thefts

By David Myers
CW New York Bureau

NORTH WHITE PLAINS, N.Y. — Would-be holdup men hoping to steal some of the millions of dollars that banks transfer over the wires each day may find themselves foiled by a device invented by a four-year-old company here just coming out of its development phase.

Fingermatrix, Inc. has already installed 17 of its digital fingerprint scanners in banks such as Chase Manhattan and Chemical Bank in New York and First Interstate and Wells Fargo in California. The scanners sit next to the banks' terminals and must be stroked before a user can gain access to a terminal. Only authorized users — whose fingerprints are kept in digital form in the bank's

mainframe system and accessed by the terminal to which the scanner is attached — are granted access to the terminals.

"The scanning takes roughly a second," explained Richard C. Kjeldsen, finance vice-president for the company. "The device compares the user's fingerprint to a digital record of what the print is supposed to look like and either verifies it and permits access or denies access."

The scanning device is linked to a controller, which then plugs into the terminal, such as an IBM 3270. Modifications in the mainframe's operating system software are required to make the scanner work, according to Kjeldsen.

The two-piece setup costs approximately \$6,500.

Kjeldsen said the scanner was developed to prevent electronic funds transfer heists from inside a bank. "With wire transfers carrying half a million to a million dollars a shot, you might want to require the user to verify his identity before each transaction," Kjeldsen said.

The scanning device also prepares an audit trail for each transaction, keeping track of who logged on to the system at that terminal, how long he had access and how much money he added to or subtracted from the bank's accounts.

But the device is effective for foiling outside-the-bank-walls capers, too. "Since the system is configured to require fingerprint verification before access is granted, it can prevent wiretap thefts," Kjeldsen said.

Fingermatrix, a public company that raised \$5.5 million in its second offering last December, foresees other uses for its scanning device. "In hotels you might register with a fingerprint and use that instead of a key to get into your room. Ultimately, the fingerprint might even take the place of a plastic [credit] card," Kjeldsen said.

But the company is not insensitive to potential abuses of its biometric access system.

"Eventually, one could conceive, if one were so inclined, a system that could track the comings and goings of the populace. But we view that as an abuse, and it can be protected against," Kjeldsen said. "It's not quite as threatening as people might perceive."

FRAUD from page 1

ran dry. "I figure I gave away between \$20,000 and \$30,000 of my own money," said Slynghsted, who now programs Apple Computer, Inc. microcomputers for prison administrators. "If I had it to do all over again, I'd still give away the money. I've been broke myself — I know what it's like."

Slynghsted said he never claimed to be a high-technology Robin Hood; that title was thrust on him by reporters.

State police agreed that Slynghsted just didn't make it as a crusader for the poor. "The claim that he gave all that money away was just an attempt to minimize his sentence," Crawford said. "He had this reputation for being a big spender down at Charlie's Tavern, where he would buy everyone rounds of drinks. He was also a big talker and that was part of his downfall."

At Charlie's Tavern nowadays, Slynghsted is a frequent topic of conversation. It's true, Silva said, that the bar's new celebrity once gave an

unemployed carpenter \$600 so he could buy a new truck. But the newspapers' claims that Slynghsted casually dropped \$100 tips for the bartenders were totally false.

"Sure, he loaned people money and wouldn't take it back," Silva said. "But a lot of that was just him trying to be a big man. He wasn't what the papers cracked him up to be. He did it all for attention."

According to Slynghsted, the Department of Social and Health Services has filed suit for triple damages to recover the purloined funds. The

state has already attached his retirement fund and savings, and he claimed authorities are demanding at least \$30,000 more in repayment.

And to add insult to injury, Slynghsted has been permanently banned from Charlie's Tavern.

"He's been permanently kicked out," Silva said. "He gave us a bad rap. He made this place look like a home for the poor and downtrodden. He made it sound like this was some sort of skid row joint. We serve the businessmen of Olympia here," Silva added.

NEWS

Benefits of bypass lauded

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Bypass facilities pay for themselves in three years or less, but the nonfinancial benefits of bypass may be even more important, three companies that bypass the telephone network said here last week at the Communication Networks Conference & Exposition (Comnet '84).

Instead of waiting months for the phone company to supply a 56K bit/sec channel, William H. Traylor said he can obtain the needed capacity almost immediately because his bypass network has the necessary bandwidth and is easily reconfigurable. Traylor, director of corporate communications for Wang Laboratories, Inc., manages a broadband cable network that ties together his company's facilities in and around Lowell, Mass. The cable, leased from a local CATV company, is now 47 miles long; it is being expanded to 70 miles.

Wang's bypass system supplants 4,500 voice-tie lines and 100 data circuits, Traylor reported, but it has far more capacity than that — 10 full-motion video channels for teleconferencing and 81 T-1 (1.5M bit/sec) channels. Thirty-six of the T-1 channels are used for voice communications; each T-1 carries 44 digitized voice signals, coded at a rate of 32K bit/sec. The remaining 45 T-1s are used for data transmission at speeds up to 56K bit/sec.

Traylor said the cost of the new cable system is less than \$40,000 a month. The formerly used leased facilities cost \$67,000 a month.

A vote for satellite

Satellite channels are "the corporate telecommunications network of the future," contended Dale Cunningham, telecommunications director of Harris Corp. Satellite channels provide the flexibility required by present corporate data communications — the ability to transmit voice, data, image and video bit streams on a dynamically reconfigurable basis — and they are less expensive than comparable terrestrial bandwidth, he said.

Harris is now using satellite circuits to connect its headquarters in Melbourne, Fla., with company sites in the West. Cunningham reported that a 1.5M bit/sec satellite link between Melbourne and Dallas costs \$26,000 a month; AT&T's Accunet 1.5 service costs \$34,500. Between Melbourne and the West Coast, the satellite facility is nearly \$50,000 a month cheaper — \$26,000 vs. \$74,000 for Accunet 1.5.

Cunningham predicted that many

corporate users are also going to be driven to bypass facilities because of the AT&T divestiture.

Possibly the largest bypass network to be built recently is the Westinghouse Electric Corp. digital integrated network, which utilizes 2 GHz, 12 GHz and 18 GHz microwaves to interconnect 20 switches serving some 17,000 station lines within the Pittsburgh metropolitan area.

Dr. K. Banarjee of GTE Business Communications, Inc., which supplied the switching equipment, reported at Comnet '84 that Westinghouse expects to save \$66 million during the first 10 years the new network is in operation.

Datakit-System 85 tie set

WASHINGTON, D.C. — AT&T's Dimension System 85 private branch exchange will become interfaceable to local-area networks later this year, AT&T Information Systems, Inc.'s head of product development, Frank Vigilante, said here last week in an interview at the Communication Networks Conference & Exposition (Comnet '84).

Some arrangement of Datakits will be added to the existing System 85 architecture later this year, Vigilante said.

The Datakit, a virtual circuit switch, is the central element in a star-type local-area network an-

nounced late last year by AT&T [CW, Dec. 12].

The addition of this capability to the System 85 has been widely predicted for some time by consultants, but Vigilante's statement was the first official confirmation that it is being planned.

Adding the Datakit to the System 85 is intended to enlarge its prospective market. Users with heavy data communications requirements would be able to route that traffic through an alternate switching device, thus reducing the danger of blocking service to their voice terminal users.



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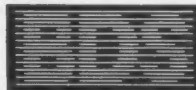
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as well as the HP software. "This is a major shift in our market presence," said Jeff Williams, HP's product line manager for the new service. The joint venture with Vitalink will enable the HP user to obtain services it must now obtain from several suppliers, Williams added.

Vitalink, a manufacturer of satellite earth stations and supplier of satellite-based private networks, has negotiated similar joint ventures with Tandem Computers, Inc. and Electronic Data Systems, Inc.

NEWS

Doll sees T-1 dynamic mux bowing this year

COMNET '84

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Dynamic multiplexers able to connect multiple voice and data channels to 1.5M bit/sec (T-1)

transmission channels and reconfigure them in real-time to meet changing traffic demands should become available within the coming year, consultant Dixon Doll said here last week.

This development will be one of several reflecting the emergence of a

new network architecture based on the integration of voice and data bit streams, Doll told the Communication Networks Conference & Exposition (Comnet '84) held here. Two basic factors are responsible for the new architecture:

■ The growing use of computerized workstations — including personal computers — by information workers, thus increasing the need for data communications facilities.

■ The divestiture/deregulation of AT&T, resulting in a much bigger and more lucrative data communications market in which AT&T as well as its former operating companies are able

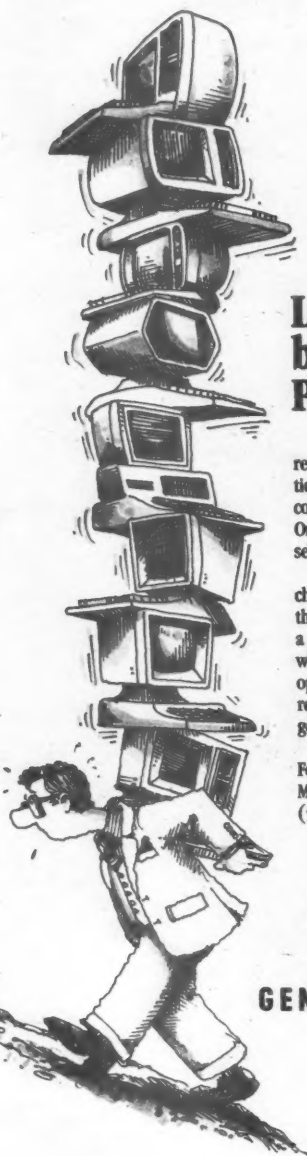
to market additional products and services.

T-1 channels are a basic element of AT&T's marketing strategy, Doll contended. The company is now aggressively promoting them as backbone links in corporate communications networks, and a number of vendors are now developing dynamic multiplexers to enhance the T-1 channel's usefulness.

Meanwhile, thanks largely to recent tariff changes, the T-1 is becoming increasingly cost-effective, Doll noted. When used to carry voice and data, it offers many users the same economies of scale.

Doll believes AT&T's recently introduced Datakit virtual circuit switch [CW, Dec. 12] is another key element in the company's new data communications architecture. He expects the Datakit, which is the central element in a star-shaped local-area network, to be connected to the System 85 voice/data private branch exchange (PBX), thus providing an efficient way of interconnecting all of a user's low- and high-speed data terminals.

For the user with a voice-only PBX, Doll said that one option is to route traffic, wherever possible, over common local loops to the PBX or an adjacent point and divert it from there to separate voice and data switching devices.



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GENERAL  ELECTRIC

NETWORK from page 1

in Ethernet baseband systems.

Star couplers available for Fiber Optic Net/One allow connection of up to 62 NIUs per star, with the added capability to interconnect stars. The maximum distance between NIUs in single-star configurations is 2,800 meters, according to the vendor.

The cost of an entry-level system with 12 device-interface ports begins at \$25,000, including NIUs, Network Management Facility software, transceivers, star couplers and the Network Operating System software. A typical Fiber-Optic Net/One with 200 device-interface ports costs \$135,000.

Further information is available from Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95050.

New SBS service

Also at Comnet '84 last week, Satellite Business Systems (SBS) announced a communications network service called the Skyline Network Service. An enhancement of SBS' Series B communications network service, Skyline will provide integrated voice, data and image transmission for applications ranging from telephone calls to videoconferencing and electronic mail.

The service will be implemented in phases beginning in the second quarter of 1984 and will be available 24 hours a day. There is a \$15 minimum monthly usage charge.

Day, night and weekend rates can be obtained from SBS, 8283 Greensboro Drive, McLean, Va. 22102.

Modems from DEC

In another announcement made at Comnet '84 last week, Digital Equipment Corp. introduced the DF100 series of modems, which features 1,200 to 9,600 bit/sec operating speeds, integrated automatic calling and standard RS-232C and RS-423A interfaces.

The five modems in the series, the DF104, DF112, DF126, DF127 and DF129, use the same circuit cards or modules in both stand-alone and rack-mount versions. Prices range from \$545 for the rack-mounted, terminal-end, 150- and 2,400 bit/sec DF104 modem to \$3,045 for a stand-alone, DF129 9,600 bit/sec, leased-line modem.

Further information is available from DEC, Maynard, Mass. 01754.

NEWS

AT&T packet net promised by year-end

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T said here last week that its previously announced Accunet Packet Service will be available nationwide by year-end through a six-node network.

The Accunet Packet Service is an upgrade of AT&T's Basic Packet Switching Service (BPSS) [CW, Sept. 26]. Accunet allows users to share switching and transmission facilities; BPSS users share only the switching facilities. Moreover, while BPSS is available at 9,600 and 56K bit/sec, Accunet also includes 4,800 bit/sec service.

The Accunet offering, unlike packet-switched services marketed by

Tymnet, Inc., GTE Telenet, Inc. and other independent vendors, does not include protocol conversion because of a limitation in the Federal Communications Commission's Second Computer Inquiry decision.

It will, however, be directly accessible by any terminal or customer host computer that supports the CCITT X.25 standard set of essential features, said Judy Arenstein, who is in charge of marketing the offering.

Arenstein announced Accunet at the Communication Networks Conference & Exposition (Comnet '84), where she was among the speakers at a session on public data networks.

Accunet Packet Service will be priced considerably below BPSS, ac-

cording to Arenstein. "Based on our present thinking," she said, "the port charge will be 25% less than what BPSS users pay," while the usage charge — both for packets transmitted and calls requested — will be 50% less.

Volume and time-of-day discounts are planned. Arenstein said users transmitting "more than 12,000 or 15,000 packets per month" would qualify for reduced rates.

Tariff submitted next month

A tariff covering Accunet will be submitted to the FCC next month. It will carry an effective date 45 days after the submission date, Arenstein said. The first two Accunet Packet

Service nodes, in New York and Chicago, are already up and operating. Four others — in Atlanta, Dallas, Los Angeles and Denver — are scheduled to begin operation before the end of this year.

Although Accunet Packet Service initially will support only X.25, it will be an enhanced version of that protocol's set of essential features. Arenstein said the enhancements consist of "fast select," "fast select acceptance," accommodation of up to 256 outstanding data packets, window sizes of either two or three packets and hunt-group support.

Support for the CCITT X.75 internetwork protocol is scheduled to be added in 1985, she noted.

U.S., Japan sign extension of sales pact with NTT

WASHINGTON, D.C. — Japanese and U.S. government officials last week extended for three years an agreement to facilitate the sale of U.S. telecommunications equipment to Nippon Telegraph and Telephone Public Corp. (NTT), Japan's communications monopoly.

Some U.S. government and industry representatives have criticized Japanese performance under the existing agreement, but a recent survey of American telecommunications

companies found most in favor of extending the arrangement as the best means for gaining access to NTT's \$3 billion annual equipment purchases.

In 1983, U.S. sales to NTT totaled \$140 million, up from \$12 million in 1981 but still far short of the \$700 million in Japanese telecommunications sales to the U.S. last year. New terms under the extension signed here last week will allow U.S. firms to participate on an equal basis with Japanese companies in NTT early-

stage research and development activities and allow U.S. firms to submit contract bids in English. NTT will also translate contract terms into English for U.S. suppliers under the new terms.

The extension was signed by U.S. Trade Representative Bill Brock and Japanese Foreign Minister Shintaro Abe. Both praised the agreement as a major step forward in U.S.-Japanese trade relations.

However, a number of telecom-

munications trade problems still remain. In particular, Japan continues to refuse to buy U.S. satellites, insisting that Japan develop its own space capabilities. In addition, the U.S. State Department is negotiating with Japan on that country's proposal to deregulate part of the NTT monopoly, specifically in the private provision of value-added networks, a move that is likely to include restrictions on participation by non-Japanese-owned companies.

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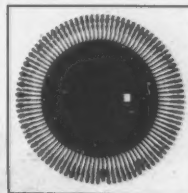
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NEWS

Micros seen causing minimal PBX delays

COMNET '84

By Lynn Haber
CW Staff

WASHINGTON, D.C. — When private branch exchanges (PBX) are used for switching data from personal computers, the

micros' "holding times" will not be long enough to have a major impact on the PBXs — and if they are, there is something that can be done to correct the problem, Dr. James Jewett told a session entitled "Personal Computer User Patterns and Their Effect on Corporate Networks" at

last week's Communication Networks Conference & Exposition (Comnet '84) here.

Jewett, who is president of Telco Research, Inc. in Nashville, reported that about 86% of personal computer usage in organizations does not involve communications. In many organizations, he noted, that figure goes as high as 98%.

"Most statistics show that during business hours, the impact of personal computers on networks has not been [major] in the sense that traffic looks a lot like voice traffic when you separate it into early morning/late afternoon hours vs. the rest of the

business day [9 a.m. to 4:30 p.m.]," Jewett said.

Therefore, fears of PBX engineering problems from long holding time due to things like personal computer terminal traffic do not hold, according to the speaker. And the use of standard traffic engineering formulas is acceptable when calculating PBX implementation.

"One of the greatest problems with personal computers is to take a given as a given," Jewett said. "The demand for personal computer usage can be very much designed to manipulate demand."

One way to improve a corporate

network's service level is to look into personal computer applications and design the personal computer network with the aid of the telecommunications department. Because most organizations are buying microcomputers at a rapid rate and controls and coordination of micro usage aren't stabilized, traffic is going "topsy-turvy," according to Jewett.

"Organizations must come up with some policies to coordinate decision-making and applications design," he said. "Today's problems are not with PBX design, but with organizational planning and understanding of needs."

"Before [AT&T's] divestiture, networks that were centralized were economic. Centralized tandem networks with local networks tied into them aren't economically justified anymore," Jewett said. "There's a trend against the economic justification of networks which is allowing more and more locations to be segmented away from the network — and micros are playing a bigger role in that."



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Keynoter calls for integration

By Lynn Haber
CW Staff

WASHINGTON, D.C. — Integration of technology, management, planning and organizational structure is the key to successful computer/communications networks of the future, according to Dr. Howard Frank, president of Contel Information Systems, Inc. Frank delivered the keynote address on "Network Technologies" at the Communication Networks Conference & Exposition (Comnet '84) held here last week.

Frank addressed the issue of integration as the next necessary step to meet the challenges of the 1990s. "In-house and in the industry, we must take all of the things we've been doing in the last decade — building information systems — and make them work together," Frank said. "If we don't do that, we will continue to propagate stand-alone systems, which present part of the problem and part of the solution, and which have to be updated so frequently that you never catch up."

The true merger of the computer and communications fields evolved in the decade between 1970 and 1980, according to Frank. Today, we are faced with networks that are both computing- and communications-oriented. "The way I would describe the network of 1984 is via distributed data processing with intelligence — at the terminal, the controller, peripherally at the network, within the network, at the front end, the host and at the back end," Frank said.

Communications nets are smart and getting smarter because of a decrease in computing costs compared with the cost of communications. "With the use of more sophisticated computing techniques, you can now pack more things into the network over the same basic communications lines of yesterday," Frank said.

NEWS

State nixes nonpaper bonds Martin Marietta wins bid

By James Connolly
CW Staff

DOVER, Del. — "Book entry" state and municipal bonds — bonds that are recorded electronically rather than on paper — probably will have their time, but that time hasn't arrived yet, the state of Delaware recently discovered.

Four of the five bidders in the state's \$50 million bond sale last month declined the state's suggestion that they stop issuing paper certificates to investors.

But even officials of the securities firm that won the bid with a conventional proposal admitted that state and municipal bonds will inevitably follow the lead of U.S. government securities.

"We are in favor of book entry and think it is inevitable that it is going to become an everyday occurrence. We had a few big customers who were not ready to go that way, although they too are in favor of book entry in the long run," said Peter T. Clarke, a vice-president of Morgan Guaranty Trust Co. of New York.

Morgan Guaranty produced the low bid for the Delaware bonds with an interest rate of 8.28%, despite having to pay an extra \$1 per bond toward the state's expense for producing paper bonds.

Noting that he expects the major-

ity of new bonds to be in book entry form in a year, Clarke said he sees no logistical or computer problems with administering book entry systems; however, he said investors have been cautious because of what they perceive as legal problems in some states. "Registered bonds were the same way when we went from bearer bonds to registered bonds, but it did come about," he noted.

Less expensive than paper bonds

The driving force in the Delaware proposal was State Treasurer Janet C. Rzewnicki, who claimed that book entry bonds would be significantly less expensive than paper bonds not only when issued but when transferred. She said the \$1 per bond charge will cover only a fraction of the cost. She also cited the improved security aspects and reduction in "hassles" in book entry systems.

"We still feel very strongly that the market is going to come around. It's just a matter of time. We were happy to see that the only bidder that chose the book entry system this time [Prudential Bache Securities] had a very competitive bid [8.35%]."

"I know that other states are planning to try book entry, and I fully expect it to be in use by the time we have our next bond issue in a year or so," Rzewnicki reported.

WASHINGTON, D.C. — The U.S. Department of Transportation announced last week that it has awarded Martin Marietta Corp. a \$684 million contract to manage the Federal Aviation Administration's (FAA) \$10 billion air traffic control system upgrade project.

Martin Marietta, the aerospace hardware producer whose headquarters are located in nearby Bethesda, Md., has teamed with six subcontractors for the five-year contract, which carries options of three-year and two-year extensions.

The group will review and oversee the development of the National Air Space System; it will also provide software validation and various

technical support services to the FAA.

The National Air Space System plan, which was inaugurated two years ago, will reportedly include replacement of the IBM 360-era computers that support the current air traffic control system, development of new software for increased FAA automation and the phasing in of more sophisticated controller equipment and flight-support facilities, including new radar, communications, landing and weather-reporting systems.

Martin Marietta said it expects to have as many as 1,000 persons working on the FAA project at the height of the contract.

Eastern reverses micro policy

MIAMI — Reversing an earlier ruling, Eastern Airlines has decided to let passengers use portable personal computers and other battery-powered electronic equipment on board its airplanes.

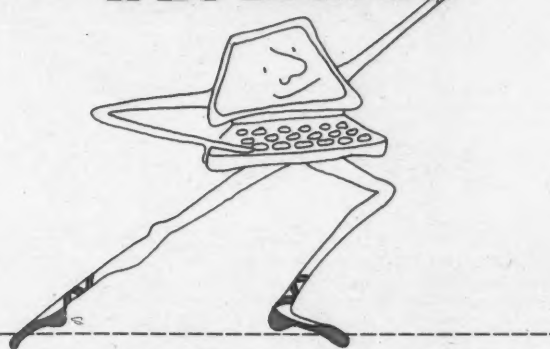
Eastern said it reached its decision last week after extensive testing had produced no evidence that such equipment interfered with aircraft navigation and communications equipment.

Electronic equipment tested and

approved by the airline for on-board use included personal computers, electronic games, solid-state calculators, hearing aids, heart pacemakers and portable recorders, a spokesman noted.

The airline said that it will continue to prohibit the use of walkie-talkies and radio-controlled toys and that, as a precautionary measure, neither personal computers nor recorders can be used during takeoffs and landings.

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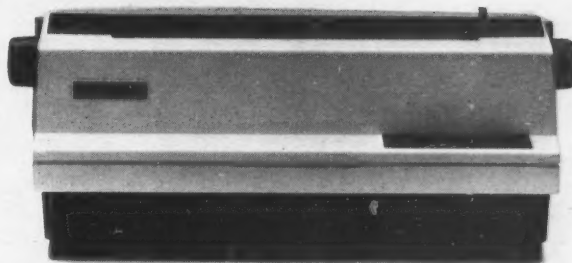
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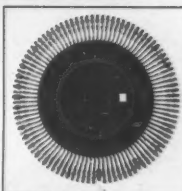
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NEWS

Micro operating systems: a crowded stage

PRODUCT SPOTLIGHT

By Patricia Keefe
CW Staff

You've bought microcomputers for your end users. Should you stay with what you've got, or should you line up your users on the leading edge? And what is the leading edge when it comes to microcomputer operating systems?

If you've been watching the marketplace drama along with everyone else, you know that the scenario for microcomputer operating systems is changing simply because micros are becoming more powerful. The previous stars — Digital Research, Inc. and Microsoft, Inc. — may soon find themselves playing cameo roles as AT&T and IBM take center stage.

While this is supposed to be The Year of Unix, not everyone is giving it rave reviews. But no matter what view of Unix is entertained — bloated and overhyped or the greatest thing since digital transmission — it appears that the 15-year-old operating system developed by Bell Laboratories will, by default, become the standard for microcomputer-based multiuser, multitasking and/or networked environments.

Why by default? Because 32-bit micros are expected to replace 16-bit micros soon, and Unix currently is the most popular hardware-independent, multiuser, multitasking operating system that can run in 32-bit environments. Moreover, Unix has achieved its popularity virtually on the strength of its own merits, as enthusiastic users — rather

than vendors with something to gain — spread the word. So fixed is Unix's rising star that industry observers consider only one competitor capable of upstaging it. That competitor is, of course, IBM.

IBM recently announced a Unix-like operating system for its Personal Computer [CW, Jan. 16], which many Big Blue watchers saw as an endorsement of Unix. Others, however, are convinced that IBM's announcement was merely a "smoke screen" or "preemptive strike" and that it is planning a VM-based operating system which could dethrone or at least provide an alternative to Unix.

At the same time, some analysts have not ruled out the possibility that an operating system developed by a lesser entity could rise to the top. Moreover, vendors of 16-bit operating systems such as Microsoft (MS-DOS and Xenix) and Digital Research (CP/M 86, Concurrent CP/M, MP/M and CP/M 68K) are not expected to fade away quietly (see story on page 15).

Another twist

There is another twist to what some have called "the battle of the microcomputer operating systems." Communications giant AT&T has announced its intention to move into the office product sector at the same time that IBM is said to be poised for entry into the telecommunications field. This will pit two of the largest corporations in the world against each other on two stages.

However, the general view is that AT&T is just learning how to compete and has its hands full juggling many roles under its current reorganization. Since it has no track record in the computer industry, it is bound to stumble, according to analysts interviewed recently, almost all of whom "would bet on IBM every time," in the words of Mac Lewis, president of the Irving, Texas-based Systems Center, Inc., a microcomputer communications software vendor.

IBM is expected to unveil a VM-based operating system for 32-bit and up machines later this quarter. "The Unix bandwagon is too strong for IBM to ignore, but it obviously doesn't want to use plain vanilla Unix," remarked Brian Jeffery, director of research for International Technology Group in Palo Alto, Calif.

Jeffery predicts that in addition to PC/IX, its Unix look-alike, IBM will endorse Xenix — Microsoft's version of Unix System III — for its Personal Computer series. However, Strategic, Inc. President Michael Killen and other analysts believe an IBM version of Unix will effectively kill Xenix.

Another option for IBM is the adaptation of a System/36-like operating system to run on the IBM

Personal Computer. Frank Gens, The Yankee Group's Director of Information Systems Research, noted that this would allow Personal Computer users to migrate to larger IBM systems.

Beyond that, analysts expect IBM to offer a proprietary operating system that is a superset of Unix running under VM. IBM recently had seven or eight different Unix-related projects under way, but it decided about a month ago to consolidate those efforts. According to Gens, IBM has two ways to attack:

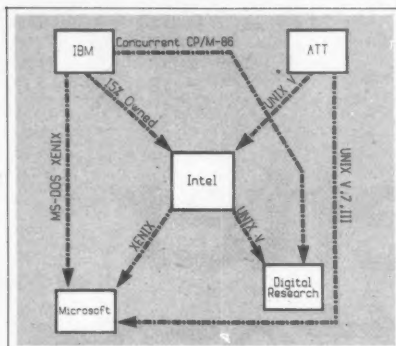
■ It can go on the defensive and use a proprietary operating system to "suck in" users over a one-way bridge to IBM products.

■ It can take the offensive, going against the idea of proprietary operating systems on the grounds it may encourage movement away from its hardware. IBM could assume that by providing a Unix-compatible system, it would be easier for users to move over to IBM. "This is an aggressive strategy that supposes that competitively priced hardware and functions will make it attractive enough," Gens said.

Robert Fertig, president of Enterprise Information Systems, Inc., agreed: "IBM is looking at the situation and realizes that it can't stop Unix from moving forward, but it can enlarge on Unix, providing features to entice users over a one-way bridge to IBM systems."

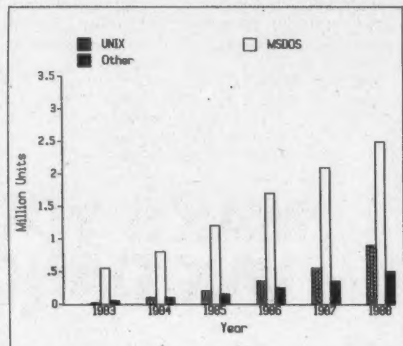
It is generally agreed that Unix has a lot to offer. It is said to be the most portable and open-ended operating system on the market today. Among

See SYSTEMS page 16



Strategic, Inc. chart

Key business relationships



Strategic, Inc. chart

Market for 16-bit business computers

Some guidelines for evaluating operating systems

Evaluating operating systems is not quite as cut and dry a task as comparing hardware configurations. Nevertheless, it can be done.

"First, determine what problem you want to solve, what applications are available and what operating systems they run on," advised Michael Killen, president of Strategic, Inc., a San Jose, Calif.-based research house. In many cases, the operating system and hardware are secondary to the application, noted Mac Lewis, president of Systems Center, Inc. in Irving, Texas.

The increasing demand for portability between systems has resulted in efforts toward providing that capability in systems that are currently lacking in this area. Unix is considered by many analysts to be the most portable operating system on the market today.

Assuming that application package and operating system incompatibilities can be solved, a user might wonder why he should bother to examine any operating system features further. Consultants warn that just because two operating systems run the same package, it doesn't mean the end result will be the same.

Performance, for example, can differ. Some op-

erating systems provide faster turnaround and response time than their competitors.

Also of importance is the environment within which the operating system runs: stand-alone, clustered or connected to a mainframe. A user who currently has a single-user, multitasking configuration but foresees moving to a multiuser configuration down the road not only does not want a single-user, single-tasking system, he wants one that will allow him to upgrade to the desired capabilities.

When choosing a personal computer and an operating system, limits are set on the software that will be available. If the operating system is changed, users are confronted with the nightmare of converting their existing applications, consultants warned.

Other issues of concern to the consultants and analysts recently interviewed include:

■ **Support** — on several levels. Killen urges users to consider who will support their operating system. What type of documentation is available? Programmers need to consider whether an operating system will support the programming language they want to run.

■ **Required memory.** Application programs are not the only system components with specific memory requirements. "If you have a 64K-byte system and the operating system requires 32K bytes, that won't leave you with breathing room," Killen warned. If there are multiple users, will a hard disk be required?

■ **Record locking.** Will the operating system allow multiple users to access simultaneously the same data while, at the same time, protecting one user from another's updates?

■ **Language.** According to International Data Corp., a market research firm based in Framingham, Mass., there is a trend emerging to move from operating systems to high-level languages as standards for portability. Digital Research, Inc. and Microsoft, Inc. are said to be writing operating systems in C and providing C compilers as part of their move toward Unix compatibility.

■ **Ease of use.** How user-friendly or business-oriented is the operating system? One frequent complaint about operating systems such as Unix, which have migrated down from larger machines, is that they are too complex and technical as opposed to business-oriented.

NEWS

Leading micro operating systems threatened

PRODUCT SPOTLIGHT



By Patricia Keefe
CW Staff

The growing power of microcomputers, some of which are capable of running mainframe applications, has created a corresponding need for more powerful and versatile operating systems. And as end users and vendors cast about for one to meet this need, it has become clear that the operating systems currently dominating the 16-bit microcomputer market will not be enough.

The search for a more powerful, hardware-independent operating system that can run in a multiuser, multitasking environment represents a solid threat to the market positions of Microsoft, Inc. and Digital Research, Inc., the vendors of those 16-bit, primarily single-user operating systems.

Microsoft is currently the lead runner, with an estimated 90% share of the market for 16-bit, single-user business operating systems. However, some analysts believe AT&T's Unix could spell doom for the high-flying vendor and its Unix look-alike, Xenix.

The same industry analysts believe Digital Research, which was unable to repeat in the 16-bit market its success in the 8-bit operating systems market, may be down but not yet out.

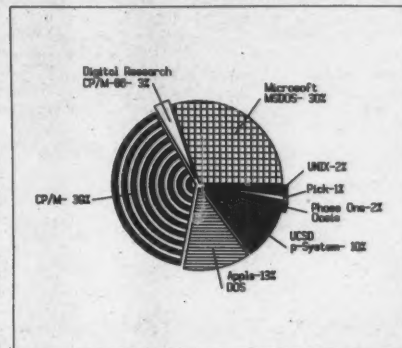
Regardless of whatever new directions the operating system market takes, there will continue to be a market for Microsoft's single-user, 16-bit MS-DOS and Digital Research's 8-bit CP/M and 16-bit, single-user CP/M 86 "from Mom-and-Pop" shops using unsophisticated, unintelligent stand-alones," predicted Robert Fertig, president of Enterprise Information Systems, Inc. in Greenwich, Conn.

Moreover, IBM's PC-DOS, its MS-DOS look-alike, still has a long life ahead of it. "IBM can't afford to and has no incentive to walk away from all those PC-DOS users," claimed Barbara S. Isgur, a microcomputer analyst for Paine, Webber, Mitchell & Hutchins in New York.

Differences between IBM's PC-DOS and Microsoft's MS-DOS are technically insignificant, al-

though there are some important user differences, analysts agreed. According to Michael Killen, president of Strategic, Inc., PC-DOS was IBM's attempt to differentiate itself from everyone else, to get people to develop products for the Personal Computer market as opposed to other vendors' products that run MS-DOS.

Both Digital Research and Microsoft are widely credited with creating the generic — hardware-independent — operating system, which may well



Business operating systems market share, 1983

have accelerated the growth of the microcomputer industry. But neither vendor can afford to rest long on its laurels — not with AT&T Technologies, Inc.'s plans to support Unix System V; not with IBM's recent release of PC/LX, a Unix-like operating system for its Personal Computers ("IBM crosses AT&T border," CW, Jan. 23); and not with IBM's rumored plans to release its own VM-based proprietary operating system.

With AT&T and IBM facing off in the multiuser, multitasking 16- and 32-bit future of microcomputing, Digital Research and Microsoft are working

hard to preserve a position for themselves in what many analysts believe will be a Unix world. Those plans may be shaped by what Killen sees as the difference between the two companies: "Microsoft has the marketing, while Digital Research has more technicians."

Both vendors are working on what will eventually be a full integration of CP/M, DOS and Unix system environments, according to Fertig. In addition, both vendors have worked hard to court Japanese, Taiwanese and other foreign vendors in an attempt to make their operating systems the primary ones for microcomputers entering the U.S. market.

Moreover, Digital Research and Microsoft also provide languages and compiler products. "Digital Research has good business in compilers, running on either CP/M or MS-DOS," said Mac Lewis, president of Systems Center, Inc. in Irving, Texas. "There are a lot more people buying compilers than is generally recognized."

Although neither Digital Research nor Microsoft has shown any interest in pursuing larger system markets, Strategic believes that this will change in a few years as both discover opportunities to move their programming language products (implemented in C) to other Unix systems, which traditionally comprise larger systems. In particular, Strategic predicts computer manufacturers of all sizes will be interested in having Microsoft's Xenix enhancements for their systems.

Other opportunities ahead for the two competitors include meeting expected user demand for functions such as voice input, artificial intelligence in system and application software, more elaborate graphics, extreme simplicity of command structure and programs that teach themselves and provide detailed assistance when required, according to Strategic.

"The greatest challenge facing Microsoft and Digital Research is to keep up with new software technologies in the face of mounting competition and to balance what can be done with what current systems can support and what users are willing to pay," Strategic concluded.

Digital Research challenged

One of the fathers of the generic — hardware-independent — micro operating system, Digital Research, Inc., has gone from total control of the 8-bit segment of the microcomputer operating systems market to second-best in the 16-bit segment of that market. And with the industry on the edge of creating a 32-bit, multiuser, multitasking standard, Digital Research may be facing its toughest challenge yet.

Although Digital Research was commonly viewed as having the 8-bit market sewn up with CP/M, IBM seriously snagged any dreams that Digital Research may have had for dominance of the 16-bit market when it endorsed Microsoft, Inc.'s MS-DOS for the IBM Personal Computer.

According to industry observers, IBM approached both vendors, but only Microsoft was willing to acquiesce to IBM's terms. Today, 90% of the 16-bit machines sold reportedly run under MS-DOS or its look-alike, IBM's PC-DOS.

"IBM talked to both, but Microsoft put together a package that suited IBM, including a few million for the license [for MS-DOS]. IBM got it for nothing," said Michael Killen, president of Strategic, Inc. "Digital Research didn't want to [suit IBM]

and was a little narrow-minded in terms of what [IBM's endorsement] meant in the long run."

Although IBM later licensed Digital Research's 16-bit offering, CP/M 86, for the Personal Computer, that came much later, at a much higher price.

These same observers believe Digital Research has been playing catch-up ball ever since Microsoft eclipsed CP/M 86 with MS-DOS via the IBM endorsement. A recent report, "Digital Research/Microsoft — The Key Issues," by Strategic, is very critical of Digital Research's strategy and suggests that unless the vendor develops a coordinated plan of attack, it may be reduced to little more than a substitute player.

At least one consultant has gone on record as having said that in order to survive in the 16-bit world, Digital Research must recognize MS-DOS as the de facto standard and move toward compatibility with that system, which Digital Research has been trying to do. For example, it has a built-in DOS switch in its Concurrent CP/M 86 and is working on a Concurrent DOS operating system.

Another step in this direction is thought to be Digital Research's an-

See CP/M page 16

Weeds in Microsoft garden?

Microsoft, Inc. is the No. 1 vendor of 16-bit microcomputer operating systems, with a 90% market share and Xenix, a popular Unix look-alike that has made it the leading independent Unix software house, according to the market research firm Strategic, Inc. of San Jose, Calif.

Nonetheless, it will find competing in a Unix-dominated marketplace no bed of roses.

It was a nod from IBM that allowed Microsoft to overtake Digital Research, Inc. in the 16-bit microcomputer operating systems arena; when IBM endorsed Microsoft's MS-DOS for the Personal Computer, software writers lined up to develop programs compatible with MS-DOS. Not content to rest on its laurels, Microsoft developed its own version of Unix, dubbed Xenix.

Given its current market share and IBM's interest in Xenix, one might think Microsoft's place is assured in the multiuser, multitasking microcomputer operating systems marketplace. But according to industry analysts, there are a number of weeds that could sprout in Microsoft's garden of success and choke its position of dominance.

Despite MS-DOS's current and continued popularity in the single-

user, 16-bit operating systems marketplace, MS-DOS as it now stands is not appropriate for IBM's plan to interlink Personal Computers, according to some analysts. Although Microsoft has been promising a multiuser upgrade to MS-DOS, users and vendors have grown tired of waiting, asserted Michael Killen, president of Strategic, Inc.

Microsoft is also expected to push Xenix heavily. "Xenix could offer a gateway between Personal Computers and other IBM systems," said George Colony, managing director of Forrester Research, Inc.

But research analyst Kenneth Lim of Dataquest, Inc. disagrees. "At one time, Xenix had a better chance of doing it, but IBM has moved away toward its own version of Unix," he said.

Xenix could run into several problems. First, it needs to be upgraded to Unix System V. Second, in addition to competing with Unix, it will have to compete with IBM's PC/IX and any other proprietary operating system that IBM may introduce.

Strategic's report noted that "if IBM were to create its own operating system for microcomputer products with MS-DOS compatibility or

See MS-DOS page 16

NEWS

SYSTEMS from page 14

its features are a hierarchical file system, networking, on-line documentation, high-level languages and computer-aided instruction, to name a few.

Many analysts agree Unix is well-suited for the 32-bit environment. Lewis suggests a likely entry point for Unix would be a \$20,000 system with 10M to 20M bytes of hard disk storage and 512K to 1M byte of memory. However, the publisher and editor of the "Unique" newsletter for Unix users, David Fiedler, thinks the \$8,000 to \$12,000 range is more realistic.

Chris Christiansen, who is also an analyst with The Yankee Group, thinks Unix is "the only viable alternative" for users who can't handle

VM, but want to move beyond Microsoft's single-user MS-DOS system. Furthermore, he said, small vendors and developers can't afford the investment required by VM.

But Unix is not without its problems, according to even those analysts who give it the nod as the next microcomputer operating system standard. Its biggest problems are that it is difficult to use for nonprogrammers and non-DPers (Unix has earned a reputation as an operating system loved by programmers, but loathed by application developers), it is not business-oriented enough and it requires an enormous amount of memory.

Moreover, few analysts believe there is a need for Unix at the 16-bit level, and most claim there is little Unix-based software for small mi-

cro. Kenneth Lim, a research analyst with Dataquest, Inc., maintained, "Unix has no importance in the micro market," primarily because the powerful and sophisticated system has yet to prove itself in the business environment.

Unix System V and VII, the two latest upgrades, have done little to alleviate this problem. Lewis said the two versions do not offer record locking and that multiuser business applications are difficult to run under Unix. Nonetheless, Unix is an idea whose time has come, Fertig said. And once AT&T unveils its promised 32-bit office system, even more attention will be focused on Unix.

The system is based on AT&T's 3B series of superminis, which runs under Unix (CW, Oct. 31). According to "Unique," the series will run on Unix

System V or System V Release 2, an upgrade the newsletter said will soon be released offering "better and more communications and networking support, but no file or record locking." The end-user price will be from \$8,000 to \$20,000, the newsletter predicted.

The strategic moves of the two giant competitors will not necessarily be the determining factor in the battle of the operating systems. Analysts are quick to stress that software houses and third-party developers could hold the winning hand. IBM and AT&T will have to expend a considerable effort courting this segment of the market and providing it with applications tools to make its job easier.

CP/M from page 14

nouncement of GSX software for MS-DOS and PC-DOS. GSX is Digital Research's graphics package, which is based on the proposed Graphical Kernel System that it is trying to push as a graphics standard, according to analysts, who are generally positive about the software. In the meantime, in addition to its 16-bit operating system, CP/M 86, Digital Research has brought out CP/Net; Concurrent CP/M for multitasking, single-user operations; and MP/M for multiuser, multitasking environments.

Perhaps with the adage, "If you can't beat 'em, join 'em," in mind, Digital Research seems to be taking moves to strengthen its position in a Unix world. It has working agreements with two chip makers, Intel Corp. and Motorola, Inc., the latter announced at the Uniform International Conference of Unix Users two weeks ago (CW, Jan. 23).

At Intel, Digital Research has taken over a project previously handled by Microsoft — porting Unix System V to Intel's 80286 chip. Fertig believes that as a result of this arrangement, Digital Research may be able to gain a dominant position in the 16-bit marketplace.

MS-DOS from page 14

if AT&T were to change licensing terms drastically for Unix, Microsoft could lose a major market share and a large fraction of its income."

Third, analysts do not expect IBM to endorse any particular version of Unix, but rather to allow its machines to run on everything. "Recent moves indicate that IBM will not support one operating system or another in the way that it did with MS-DOS," according to Barbara S. Isgur, a microcomputer analyst for Paine, Webber, Mitchell & Hutchins. "Instead, IBM will let the market sort it out." This means Microsoft cannot expect to get the same boost for Xenix that it got for MS-DOS from IBM.

Possibly as part of its Unix strategy, Microsoft has released Version 3.0 of MS-DOS, a C-code implementation of MS-DOS, complete with Unix-like features. The planned upgrades will move MS-DOS closer to Xenix. "Microsoft is well aware that the key to holding onto both markets is maximum application portability and evermore added value. The enhancements that Microsoft is making to both MS-DOS and Xenix are not available anywhere else and will not be for some time," the Strategic report said.

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 31 Manager/Supervisor/Engineer
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3. COMPUTER INVOLVEMENT (Circle all that apply)

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 A. Mainframes/Supervisors
 B. Microcomputers/Desktops
 C. Microcomputers/Notebooks
 D. Communications Systems
 E. Office Automation Systems

NEWS

Programs help DP managers deal with staffs

By Robert Batt
C/W West Coast Bureau

PALO ALTO, Calif. — A new series of software programs that reportedly enable senior managers to deal more effectively with their subordinates and peers is the center of increasing attention from computer users.

The three programs — The Management Edge, The Negotiation Edge and The Sales Edge — elicit from the user information about himself, the situation involved, the goal and the opponent or employee. Manufactured by Human Edge Software Corp., a newly formed company here, the packages run on microcomputers manufactured by IBM and Apple Computer, Inc. and on IBM-compatible microcomputers. The programs are the brainchild of Human Edge Software's co-founder, James Johnson, a clinical psychologist and former project director at IBM.

Using elements of psychological testing, game theories and expert systems, The Management Edge, for example, conducts a "dialogue" with the end user to elicit the fine points of strategy and to construct tactical plans that are customized to the user, client or setting.

The information is presented to the user in the form of a printout that "walks" him through the proper scenario to achieve the resolution of the problem.

"The Management Edge was very useful in determining what approaches I should take in dealing with particular situations," explained Robert Spiegelman, recently appointed director of the Kalamazoo, Mich.-based W.E. Upjohn Institute for Employment Research. "It showed me that I needed to act in a more confident, informal and interactive manner than I was used to. As a result, I have become much more accessible to the people I work with."

Spiegelman, former director of the

Social Economic Research Center at SRI International, Inc., said that The Management Edge proved particularly useful in boosting a project on the employment implications of robotics, which had been moving very slowly.

The Negotiation Edge

Working with The Negotiation Edge, a manager answers a number of basic questions about himself, the other individual involved in the situation and the environment, and then he states his objectives. The computer then produces a step-by-step strategy comprised of opening bids, counteroffers, strategies for working with the other person, methods of countering objections and closing techniques.

According to Hal Ditmer, a partner and principal in the San Francisco consulting firm Sierra Resource Group, The Negotiation Edge was critical in a recent joint venture deal.

"The program was very helpful in identifying the other person's personality traits. It showed me that the negotiation called for a logical, detached approach which appealed to the other person's intelligence and enabled him to make the offer."

"As a result, he made a proposal that I was amazed at," Ditmer said.

In another case, Bob Honig, marketing sales director of Silicon Valley, Calif.-based Victor Aviation Services, Inc., used The Sales Edge program to make major aircraft-engine sales. "I use the package when I think I may have a stumbling block with a particular customer. I am able to build up a profile of the client and work out various strategies for closing a sale."

"Recently, I used the program to make a sale to the president of a local flying club. If I had used my normal routine, I would have scared the customer off because of his particular personality. By using the program, I was given essential ideas on how to

More self-help software

WOODLAND HILLS, Calif. — A psychologist here has developed four self-help programs for people experiencing psychological problems: "Handling Relationship Problems," "Coping with Stress," "Handling Depressed Feelings" and "Treating Sexual Problems."

"Many people who need help don't pursue it because they can't afford counseling or are too embarrassed to admit that they need it," said Dr. Robert Reitman, the developer. "Personal computers alleviate these problems."

After the user enters data on menu-driven screens, each program helps to identify feelings or beliefs that create the problem and offers guidance to help solve it, according to the vendor of the software, Paycomp, Inc.

"These programs are not designed to correct serious psychological problems," said Nick Barnett, a Paycomp spokesman.

"They help cure minor problems or can be used with other psychological tools to treat serious problems," he said.

The programs, which cost \$89.95 each, run on the Apple Computer, Inc. Apple IIe or the IBM Personal Computer, according to a Paycomp spokesman.

Paycomp, Inc. is located at Suite 101, 22055 Clarendon St., Woodland Hills, Calif. 91367.

succeeded with him.

"I always follow the recommendations of the program to a tee," Honig added.

According to Human Edge Software, which put a \$250 price tag on each of the three programs, no prior skill in computers is required to use the programs, and the entire interac-

tion usually takes no more than 30 minutes.

"The Management Edge offers a new method of understanding and communicating with co-workers, subordinates and superiors by presenting expert management advice that can enhance the user's overall performance," Johnson said.

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NEWS

Program tracks bid-rigging for Minnesota

By Paul Korzenowski
CW Staff

ST. PAUL, Minn. — The Antitrust Division of the Minnesota attorney general's office is using a computer program to evaluate highway construction contracts for evidence of bid-rigging.

Minnesota awarded

\$213.4 million worth of state and federal highway construction contracts in 1983. "Previously, the only way to track bid-rigging was a hit or miss approach," said Mark Steadman, an investigator in the antitrust division. "It was difficult to sort the volume of contracts written.

Randomly, we would search files for cases of grossly disproportionate pricing. This program provides an organized approach. It helps us collect, analyze and interpret data."

The program produces statistical reports from parameters entered by investigators

and a data base storing contract information. "The reports eliminate cases where pricing is reasonable and help identify construction projects with possible bid-rigging," explained Steven Kilgriff, an assistant attorney general. "Since installing the system 14 months ago,

the number of cases under investigation has increased dramatically."

No charges yet

But no one has yet been charged with bid-rigging, which generally occurs when two or more contractors agree in advance who will win a public construction contract. "The computer is a useful tool for identifying possible bid-rigging cases," Kilgriff said. "Proving that bid-rigging occurs is an involved, time-consuming process." Nevertheless, "while I can't point to actual indictments since we began using the system, I will say that we have worked more efficiently and effectively since the program was installed. There are more cases under investigation now than there were previously."

The program was designed by the Massachusetts attorney general's office with funds from the U.S. Justice Department. "In 1981, our office became interested in the program," Kilgriff said. "The Mass. attorney general's office gave us the program. Currently, there are approximately 20 states using the program."

The Minnesota attorney general's office uses a Control Data Corp. Cyber 170/835 mainframe-based, time-sharing system residing at the University of Minnesota. Tailoring the program for Minnesota cost less than \$5,000, according to the attorney general's office. "Time saved using the system paid for the original investment," Kilgriff said.

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LOS ANGELES — James Wiesler, vice-chairman of the Bank of America, will deliver the keynote address for Expo '84, the Electronic Banking Conference and Equipment Exposition. The conference, sponsored by the Bank Marketing Association, Western Chapter, and co-sponsored by the Inter-Financial Association, will be held March 4-7 at the Hyatt Hotel here.

The conference will focus on the latest developments in electronic funds transfer and will feature more than 50 speakers participating in 43 separate educational sessions.

Registration is \$465 for the first registrant and \$385 for additional registrants.

More information is available from The Bankers' Institute, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

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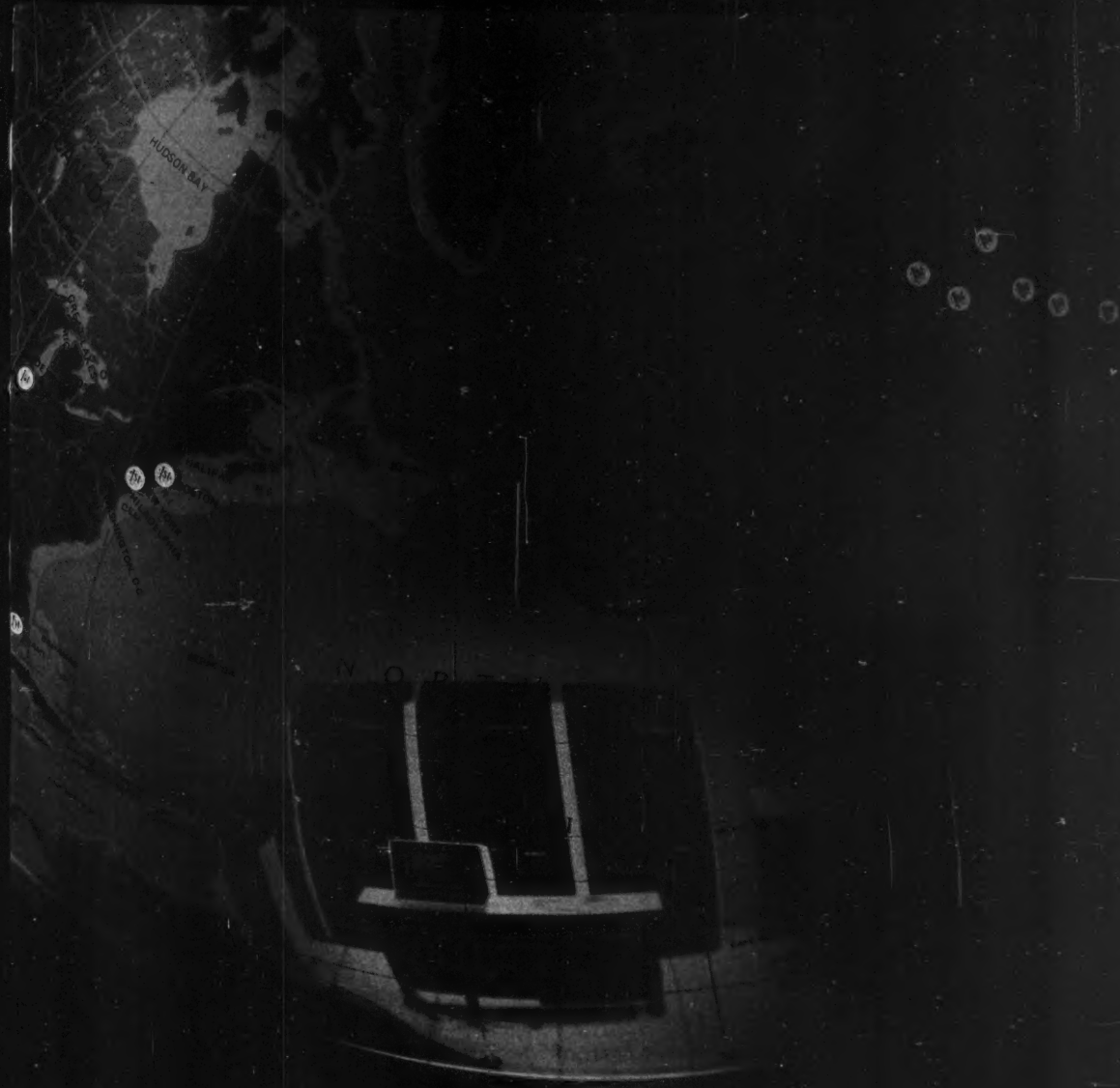
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NEWS

Fose '84 slated for March 19-22

WASHINGTON, D.C. — The Eighth Annual Federal Office Systems Expo (Fose '84) will take place March 19-22 at the Convention Center here. Conference organizers expect conference and show participants to include office automation decision makers from both the federal and the commercial sectors.

Fose '84 will feature hands-on activities as well as lectures. Included will be a personal computer center, where registrants may experiment with personal computer hardware and software, and the Office Automation Game, where up to 125 people can practice management "game plans."

The first day will be set aside for 10 conference sessions, at a one-day cost of \$150. The four-day conference will cost \$275 for registrants signing up before Feb. 10 and \$295 after then.

The show portion of the expo will run from March 20-22 at a cost of \$95 per day. Registration is free until Feb. 25 and is \$15 at the door.

More information is available from the show organizer, National Trade Productions, at 9418 Annapolis Road, Lanham, Md. 20706.

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AUUA meet to be held in Nashville

NASHVILLE — More than 90 work sessions are being planned for the four-day spring conference of the American Unibank Users Association, Inc. (AUUA), which will be held at the Hyatt Regency here March 19-22.

AUUA is a group of about 1,000 computer user companies throughout the U.S. and Canada that holds semiannual conferences for the purpose of exchanging information in the data processing field.

A keynote speaker has yet to be announced, but common interest groups — education, management "game plans," state and government — and product line groups will be featured.

The conference registration fee is \$150 before March 5 and \$180 after that date. More information is available from Gail DeLaurier, Small Business Administration, 5906 Bedford Lane, Clinton, Md. 20735.

ACM meet scheduled

CHICAGO — The Association for Computing Machinery's (ACM) North Central Regional Conference on March 22-23 will focus on strategies for integrating microcomputers and mainframes in a work setting. Hosted by the Chicago Chapter of ACM, the conference will be held at the Midland Hotel in downtown Chicago.

Cost of registration is \$300. More information is available from Sharon Pyrcz Kaminecki, Conference Chairwoman, North Central ACM '84, P.O. Box 2381, Chicago, Ill. 60690.

"IDMS/R represents a major advance in database technology."

Dave Litwack*

Because IDMS/R is the first relational DBMS designed for both the DP professional and the end user.



*David Litwack is Cullinet's Vice President of Product Development. Mr. Litwack has contributed significantly to the many technical advances Cullinet has achieved in database software products, including IDMS/R. Mr. Litwack joined Cullinet in 1976. He is a Cum Laude graduate of Brandeis University and holds a Masters in Computer Science from Boston University.

IDMS/R is not only a relational database management system, but a particularly powerful one. IDMS was made relational by removing all pointers and allowing the user to define data as tables and providing the traditional relational operators such as selects, projects and joins. The major benefit of a relational DBMS is the capacity to develop applications faster because the developer does not have to be concerned with the database design. IDMS/R provides this and much more.

For example, the Automatic System Facility (ASF) of IDMS/R is a major advance over fourth generation languages. The ASF is so comprehensive and easy to use that all a user need do, to develop an application, is define a relational record. The Automatic System Facility dynamically generates all necessary supporting structures including data definitions, screen formats, application processing logic, and documentation.

So, the developer can witness the application being produced, literally, in seconds. This capability makes IDMS/R the perfect system for the end user.

Data processing professionals can use the ASF to help develop production applications. The ASF can be used to build a prototype that can be enhanced, using Cullinet's fourth generation language, ADS/OnLine, into a complex production application. But, when they build a complex high volume application using IDMS/R, DP professionals require outstanding performance. Typically, 5% of the data relationships (joins) in any application are accessed 95% of the time. With IDMS/R, they can simply change these relationships to predefined joins and benefit from a dramatic boost in performance. We call it Relational Fastpath. Relational Fastpath makes IDMS/R a unique DBMS and a perfect system for DP professional's system development needs.

In addition, IDMS/R has the most sophisticated back-up and recovery capability of any DBMS, full integration with personal computers and is also integrated with Cullinet's complete line of financial and manufacturing applications.

In summary, IDMS/R was designed to satisfy the requirements of those who want to develop applications faster and those who have the responsibility of processing them.

For further information, attend a Cullinet Seminar. Mail the attached coupon or call the Cullinet Seminar Center at 1-800-225-9930 (in Massachusetts, 617-329-7700).

IDMS/R Seminar cities and dates

City & State	Date	City & State	Date	City & State	Date
Albany, NY	Mar 13	Ft. Worth, TX	Mar 15	Ottawa, ON	Feb 21
Allentown, PA	Mar 1	Greenville, SC	Mar 6	Philadelphia, PA	Feb 8
Atlanta, GA	Feb 15	Hartford, CT	Feb 14	Pittsburgh, PA	Feb 29
Arlington Hts., IL	Feb 23	Indianapolis, IN	Feb 21	Portland, ME	Feb 21
Augusta, GA	Mar 14	Jackson, MS	Mar 15	Portland, OR	Mar 15
Austin, TX	Feb 14	Joliet, IL	Feb 9	Quebec City, PQ	Feb 15
Baltimore, MD	Feb 21	Kansas City, MO	Feb 22	Quincy, IL	Feb 29
Bloomington, IL	Feb 21	Lexington, KY	Mar 30	Raleigh, NC	Mar 20
Boston, MA	Mar 8	Little Rock, AK	Mar 13	Richmond, VA	Feb 8
Boston	Feb 23	Los Angeles, CA	Feb 9	Rockford, IL	Feb 14
Westwood, MA		Louisville, KY	Feb 16	Sacramento, CA	Feb 21
Bridgeport, CT	Mar 6	Madison, WI	Mar 15	St. Louis, MO	Feb 8
New Haven, CT		Meadowlands, NJ	Mar 7	Salt Lake City, UT	Feb 21
Burlington, MA	Feb 9	Memphis, TN	Feb 23	San Antonio, TX	Mar 15
Charleston, WV	Feb 29	Miami, FL	Feb 16	San Diego, CA	Feb 23
Charlotte, NC	Feb 23	Milwaukee, WI	Mar 7	San Jose, CA	Feb 14
Chicago	Mar 20	Montreal, PQ	Mar 14	Springfield, IL	Mar 5
Rosemont, IL		(French)		Syracuse, NY	Feb 14
Cincinnati, OH	Mar 21	Nashville, TN	Feb 16	Tallahassee, FL	Mar 1
Columbus, GA	Feb 28	New Orleans, LA	Feb 23	Toledo, OH	Feb 24
Columbus, OH	Mar 9	New York, NY	Feb 22	Tucson, AZ	Mar 20
Davenport, IA	Mar 13	New York, NY	Mar 20	Vancouver, BC	Mar 14
Des Moines, IA	Feb 16	New York/Rye, NY	Mar 13	Washington, DC	Mar 5
Detroit, MI	Feb 9	Oakland, CA	Mar 13	Wichita, KS	Mar 8
Detroit, MI	Mar 14	Omaha, NE	Mar 1	Winnipeg, MB	Mar 6
Edmonton, AB	Feb 15	Orange County, CA	Mar 6	Worcester, MA	Feb 16
Pt. Wayne, IN	Mar 6	Oshkosh, WI	Feb 28	York, PA	Feb 15

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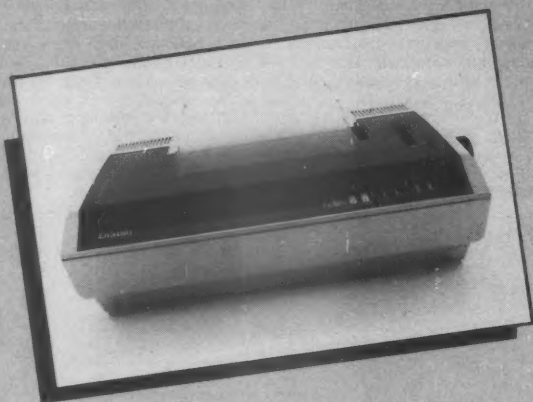
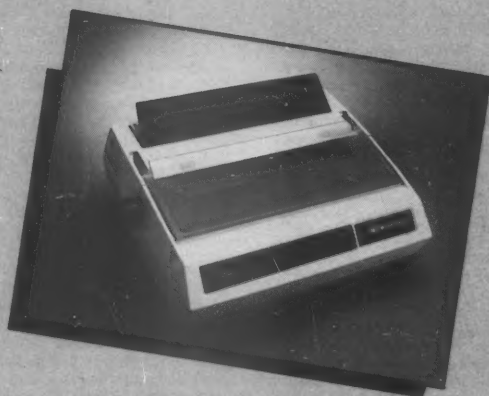
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NEWS

TURNAROUND TIME

LARRY LONG

Q I've been unhappy in my current position for the last two years. However, I've been reluctant to seek another job, primarily because of the cost of relocating.

I'm gaining good experience, but my current employer is top-heavy. If I stay here, I may never go past project leader.

Now with an upswing in the economy and lower interest rates, I'm feeling more confident about changing jobs. But before I polish up my resume, I would appreciate your thoughts on whether you think this is a good time to enter the job market.

A You are not alone. Thousands of computer professionals have been biding their time until the time is right to seek employment elsewhere. I would not be surprised if one out of five people in the computer career fields changes jobs by the end of the year.

I'm going to step out on a limb and predict a substantial increase in the demand for computer professionals by April or May. It will again be a seller's market for qualified, experienced professionals and to a lesser extent for recent graduates. The seller's market may only last through the summer, but every indicator points to increased activity for this marketplace.

An improved profit picture is causing companies to relieve hiring restrictions that have been in effect for as much as three years. The depressed economy, however, has had little effect on the demand for information services. Managers have continued to demand more and more services, but in many organizations the MIS head count has decreased.

The net effect of this imbalance in demand for services and MIS personnel is that companies are going to have to hire not only for 1984, but for 1982 and 1983. Openings are for new positions and for positions that were vacated and not filled.

Q Our college's development office recently informed us that funds have been made available to purchase 20 personal computers in each of the next two years. A committee of four, which I chair, selected the [name omitted] personal computer because it offered more memory and cost less than the other four microcomputers.

Several department chairmen, the director of admissions and now the president of the college have expressed concern over our decision. They feel that we should have selected the IBM Personal Computer or one that is compatible with it.

If we order the personal computer we selected, we can get 20% more personal computer than if we ordered the IBM machine. The administration will not stand in our way, but do you think the extra hardware is worth the possible repercussions?

A I do not make hardware decisions in this column, but I will highlight a few points for your consideration.

One has only to pick up the latest

business or computer periodical to get a feel for the enormous impact of the IBM Personal Computer. To a great extent, its success has stifled entrepreneurial innovation. Even major manufacturers are producing or planning to produce microcomputers that are, to varying degrees, compatible with the Personal Computer.

Like the hula hoop and pet rocks, the IBM Personal Computer is a phenomenon. This is reality. IBM has publicly announced its intention to increase substantially production of the machine. Also, the number of IBM-compatible personal computers is growing.

From a practical standpoint, I cannot help but share the concern of your college administrators. You must weigh the value of the additional hardware against the probability

that your students will see either an IBM Personal Computer or a look-alike when they graduate.

Q I have 10 years of hands-on computer training and am solely responsible for processing and maintaining a utility billing and a payroll system. I had three days of on-the-job training and attended three week-long training seminars. I have not attended college, but I am definitely interested in both broadening my computer skills and in companies interested in helping me do so.

Would I be considered experienced? Do I have management potential? Are there companies out there looking for me?

A Certainly you have experience and, perhaps, even management

potential. But realistically, in today's competitive environment, you will need a degree to leverage your experience into more advanced positions.

Data processing and computer science have become glamour careers and lured tens of thousands of people into degree programs. This dramatic increase in the number of people holding computer-related degrees has almost made possessing some kind of degree a requirement for DP management positions.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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NEWS

Taiwan court sentences six for 'bad Apples'

By Patricia Keefe
CW Staff

TAIPEI, Taiwan — A court here has sentenced six computer executives to eight-month prison terms for copying Apple Computer, Inc. software, the first such victory for Apple in its bid to halt the proliferation here of "bad Apples" — pirated copies of its products.

Moreover, the ruling marks the first time computer piracy has been punished with jail terms in Taiwan, according to Apple attorney Jeffrey Blatt, an attorney with the Beverly Hills copyright and patent firm of Breakley, Sokoloss, Taylor & Zafman.

It has been a busy year in the courts for Apple. Overall, the microcomputer maker has filed about 35 copyright and patent-infringement suits around the world, eight of which have resulted in criminal cases in foreign courts, Blatt said.

Those eight cases resulted in suspended sentences, which is very common in these cases, even in the U.S., according to Edward Taylor, a principal with the Beverly Hills firm. Although there are a "whole slew of companies" that have filed copyright and patent-infringement suits in Taiwan, Taylor believes Apple is the only computer manufacturer.

Customs' Tripwire

In addition to Apple's vigilance, the U.S. Customs Office has seized more than 2,000 ersatz Apples for copyright and patent violations under its Tripwire operation to combat fraud.

The six executives, all from different companies, were convicted in district court here of illegally copying two copyrighted programs for the Apple II: Auto-Start ROM [read-only memory] and Applesoft Basic.

Convicted were Kuo Chung-tin, general manager of Pison Science Technique Co.; Lei Yun-su, president of Lei-Ming Enterprises Co.; Liao Tseng-lu, general manager of Apollo Computer Co., which has no connection to the Chelmsford, Mass.-based company of the same name; Charles Chen, general manager of Sound Electronics Co.; John Lee, manager of IDA Computer Co.; and Lee Shian-yi, president of Main City Enterprise Co.

Some of the defendants plan to file appeals. Until the outcome of those appeals, the six defendants reportedly have ceased marketing machines that resemble Apple's.

There appears to be some confusion over Taiwan's copyright laws, last updated

in 1964, years before the arrival of the computer piracy issue. Questions have been raised about whether Taiwan's copyright laws cover software, programs or data for computers.

Some attorneys here believe that Taiwan's copyright provisions protect

printed words only. It is on this basis that at least one of those convicted is said to be basing his appeal.

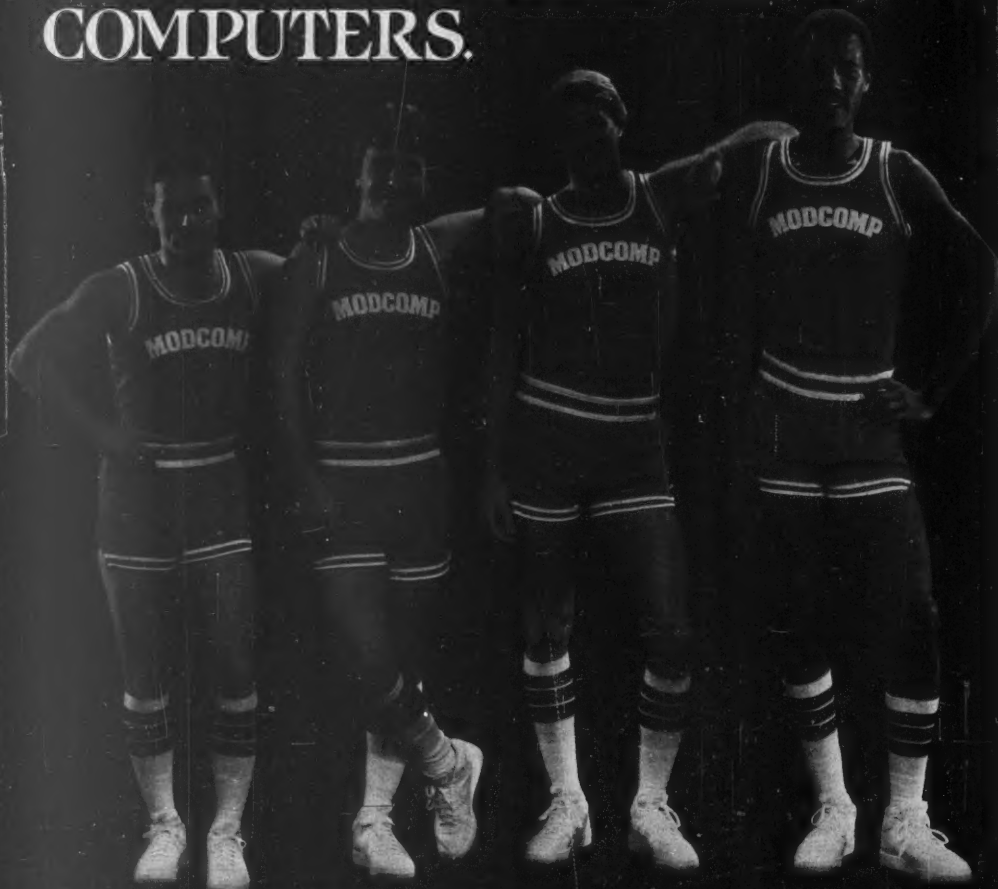
Draft revisions to Taiwan's copyright laws covering software are under consideration by Taiwan's legislature. The revisions reportedly protect software as

a literary work, and at least one member of the Interior Ministry's copyright committee has been quoted as saying he considers software a literary work. Moreover, the ministry is said to have granted as many as 20 foreign and domestic companies software copyrights despite the lack

of an "express provision" of the law.

The Taiwan government has become more responsive to this issue for a number of reasons, Taylor said. "First of all, it doesn't help their image very much. They want to build a computer industry, but not one built on copies."

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NEWS

INTERNATIONAL
REPORT

ly followed Westpac's lead toward a cashless society when it purchased a 32-bit Tandem Computer, Inc. TXP processor for the development of its own electronic funds transfer system. The Tandem machine, believed to have cost over \$460,000, will initially front-end ANZ's two IBM 3081 mainframes.

AUSTRALIA

MELBOURNE — The Australian and New Zealand Banking Group (ANZ) recent-

ly followed Westpac's lead toward a cashless society when it purchased a 32-bit Tandem Computer, Inc. TXP processor for the development of its own electronic funds transfer system. The Tandem machine, believed to have cost over \$460,000, will initially front-end ANZ's two IBM 3081 mainframes.

commercially its custom-made local-area network system called Monet. A university source said Monet interconnects 450 IBM 3270 terminals and 160 computer ports on 14 Digital Equipment Corp. VAX-11 superminis equipped with IBM's Systems Network Architecture/Synchronous Data Link Control.

CROWS NEST — Several newer and cheaper data base

management systems outperform older and costlier systems in terms of efficiency, flexibility and ease of use. This was the response from a recent survey of Australian users. The product which scored the highest marks was Sir/DBMS from Sir Australia Pty. Ltd., which runs on IBM and IBM-compatible machines. Sir/DBMS received higher marks from users than IBM's own IMS and it costs less than IMS.

FRANCE

PARIS — The urgent need for telecommunications standards in Europe was recognized here by the directors of the European Postal and Telephone Administration last month. The directors acknowledged that the telecommunications and data processing industries are merging, and common standards are crucial to enable European manufacturers to compete with American giants such as AT&T and IBM.

PARIS — In the wake of Apple Computer, Inc.'s Macintosh announcement, retailers and distributors here have said IBM will soon cut Personal Computer prices for big customers by 7%. The Personal Computer distributors, which number about 130 (Apple has 350), speculate that IBM will rebound during 1984 with introductions of a portable microcomputer, a microcomputer based on Intel Corp.'s IAPX 286 and a multiuser system.

JAPAN

TOKYO — A color television/microcomputer called Paxon has been unveiled here by General Corp., a medium-scale integrated manufacturer of electrical appliances. The machine is said to run under the MSX Basic operating system and feature a 2,000-char. display screen. Pricing on the system starts at \$544. The keyboard is sold separately at a cost of \$78.

TOKYO — Sord Computer Corp. has released a textbook-size microcomputer called The Success, which comes equipped with Sord's Integrated Software System. The software features an English-word processor, communications capabilities, a calculator and Sord's I-Pips programming language. The system's 32K-byte memory is expandable to 64K bytes. Options include microcassette data recorders, a thermal printer and a bar-code reader. The Success costs \$761, the vendor said, and will be marketed in the U.S. as well as in Japan.

WEST GERMANY

LUDWIGSHAFEN — Industry watchers here maintain that manufacturers of IBM plug-compatible machines and its close competitors are gearing up to fight IBM in the mid-range computer arena. Burroughs GmbH's A-Series is thought to be a strong rival for IBM's 4361/4381 systems, and BASF recently introduced two models (7/71 and 7/72), which are based on Hitachi Ltd.'s M 260 machine.

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NEWS

IEEE offers job bank service

WASHINGTON, D.C. — The U.S. Activities Board (Usab) of the Institute of Electrical and Electronics Engineers (IEEE) has announced a service designed to help members find employment.

The Professional Engineering Employment Registry (Peer) allows members to

place their resumes in a data base that employers with job openings can examine for candidates.

There is no charge to the applicant for the employment service, according to Richard J. Backe, employment assistant task force chairman for Usab.

Peer is operated on behalf

of IEEE by Jobnet, Inc., a Massachusetts firm, Backe maintained.

Peer applications and further information for IEEE members and employers are available from Peer, which is located at Suite 608, IEEE Washington Office, 1111 19th St. N.W., Washington, D.C. 20036.

Asis seeks candidates

WASHINGTON, D.C.—The American Society for Information Science (Asis) is accepting nominations for three annual awards: the Institute for Scientific Information (ISI) Dissertation Scholarship Award, Student Paper Contest Award and Outstanding Teacher Award. Asis plans to present the

awards during its annual meeting, scheduled Oct. 21-26 in Philadelphia.

The \$1,000 ISI Dissertation Scholarship Award is given to an active doctoral candidate in an information science, degree-granting institution. The candidate must have completed course work and had a dissertation proposal accepted by the institution. Candidates should submit a description of the research, a schedule for completion, a budget, a list of financial support, names of dissertation adviser and committee members and a cover letter from the adviser endorsing the proposal. Nominations must be submitted by July 1.

Asis plans to award round-trip travel expenses and registration fee for its annual meeting to the Student Paper Contest Award winner. Any student not in a doctoral program is eligible; papers must be endorsed by a faculty member and submitted by June 15.

The Outstanding Science Teacher Award will be presented to a teacher who has demonstrated sustained excellence in teaching information science. Candidates who teach an information science topic on a continuing basis in an academic or nonacademic setting are eligible for the \$500 award. Deadline for filing nominations is June 15.

Nominations should be submitted to Betty Foley, Asis Headquarters, 1010 16th St., Washington, D.C. 20036.

'VDT News' published

NEW YORK — The first issue of "VDT News," a newsletter that examines the health and safety risks associated with video display terminals, was published last month by "Microwave News," a publication that reports on non-ionizing radiation.

The bimonthly newsletter will examine health problems, such as eye strain, back and neck aches, radiation-induced cataracts, miscarriages and fetal abnormalities, according to the publisher.

"There is need among employees and employers to understand better the possible health risks linked to VDTs," Louis Slesin, "VDT News" publisher, said.

A one-year subscription costs \$18 for individuals and \$35 for institutions through P.O. Box 1799, Grand Central Station, New York, N.Y. 10163.



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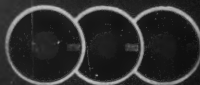
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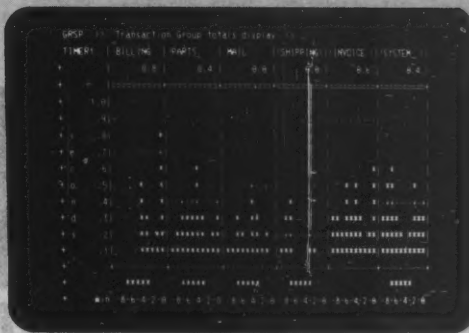


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To recognize impending problems by spotting short-term trends, Time Interval Analysis presents response times for three distinct intervals such as 5, 15 or 30 minutes. To determine what your



RTA/IMS' Moving Time Slot Analysis displays "Fixed Window" (right side of screen) and "Dynamic Window" (left side of screen).

response time was for transactions at certain periods of the day (ex. 9:00-9:30, 9:30-10:00, 1:00-2:00, etc.), RTA/IMS' Selected Time Slot Analysis will display the response time for your specified transaction—that simple and that easy.

RTA/IMS provides real-time feedback on IMS response time so that you observe short-term trends, receive dynamic warning of performance problems, and thus improve IMS service levels to your end users.

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NEWS

CALENDAR

WEEK OF FEB. 26

FEBRUARY 26-MARCH 2, ANAHEIM, CALIF. — HP 3000 International Users Group's (IUG) Annual European Conference. Contact: Leslie Nicholson, HP 3000 IUG, 2570 W. El Camino Real, Mountain View, Calif. 94040.

FEBRUARY 27, NEW YORK — Introduction to the IBM Personal Computer. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

FEBRUARY 27-28, BOSTON — Software Tools for Distributed Support Systems. Contact: Dr. Warren G. Briggs, Suffolk University School of Management, Beacon Hill, Boston, Mass. 02114.

FEBRUARY 27-28, DALLAS — How to Manage Data and Information as a Resource. Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

FEBRUARY 27-29, MINNEAPOLIS — Data Communications: Networks Design and Optimization. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 27-29, ATLANTA — Microcomputer Data Base Management Systems. Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

FEBRUARY 27-29, WASHINGTON, D.C. — Federal Software Procurement. Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

FEBRUARY 27-29, DENVER — Operations Management and Data Control. Contact: Eric Franks, The Seminar Broker, 3212 W. 133 Ave., Broomfield, Colo. 80020.

FEBRUARY 27-29, SAN FRANCISCO — Managing the Maintenance of Programs and Systems. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

FEBRUARY 27-MARCH 1, SAN FRANCISCO — Compeon '84. Contact: IEEE Computer Society, 10662 Los Vaqueros Circle, Los Alamitos, Calif. 90702.

FEBRUARY 27-March 1, SAN FRANCISCO — Data Base Administration and Control Workshop. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

FEBRUARY 27-March 2, INDIANAPOLIS — Structured Analysis and Design Workshop. Contact: J. Baldwin, Yourdon, Inc., 1133

Ave. of the Americas, New York, N.Y. 10036.

FEBRUARY 27-MARCH 2, ORLANDO, FLA. — CICS Programming. Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

FEBRUARY 27-MARCH 2, NEW YORK — CICS/VS Command-Level Debugging. Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

FEBRUARY 27-MARCH 2, NEW YORK — CICS/

Command. Contact: Comped Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

FEBRUARY 27-MARCH 2, HOUSTON — Structured Analysis and Systems Specification Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Feb. 27-March 2 in Philadelphia.

FEBRUARY 27-MARCH 2, PHOENIX — Structured Analysis for Real-Time Sys-

tems. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

FEBRUARY 27-MARCH 2, BOSTON — CICS/VS Internals. Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

FEBRUARY 27-MARCH 2, NEW YORK — CICS/Testing and Debugging. Contact: Comped Technical Corp., 10 E. 21st St., New

York, N.Y. 10010.

FEBRUARY 27-MARCH 2, ATLANTA — Systems Analysis and Design. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 1, NEW YORK — PC-DOS 2.0. Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

MARCH 1, INDIANAPOLIS — Computerized Personnel/Payroll Seminar.

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Contact: Insci, 95 Chestnut Ridge Road, Montvale, N.J. 07645. Also being held March 1 in Toronto.

MARCH 1, NEW YORK — **PC Communications.** Contact: Center for Advanced Data Processing, Inc., Suite 402, 450 7th Ave., New York, N.Y. 10123.

MARCH 1-2, LOS ANGELES — **Data Communications: Advanced Concepts, Products and Services.** Contact: Datapro Research Corp.,

1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 5-6 in Boston.

MARCH 1-2, NEW ORLEANS — **Security Management Forum.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MARCH 1-2, ATLANTA — **Intellectual Property in the Computer Industry: A Management and Legal Perspective.** Contact: Depart-

ment of Continuing Education, Georgia Institute of Technology, Atlanta, Ga. 30332.

MARCH 1-2, CHICAGO — **The Fourth-Generation Data Management Software Seminar.** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

MARCH 1-2, WASHINGTON, D.C. — **Security in the Electronic Office: Micros, Word Processors and Work-**

stations. Contact: Computer Security Institute Educational Resource Center, 43 Boston Post Road, Northborough, Mass. 01532.

MARCH 1-2, CHICAGO — **Computer Networks: Protocols, Standards and Compatibility.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 1-2, ATLANTA — **Software Maintenance.** Contact: U.S. Professional

Development Institute, Software Development in Government, Department A, 1620 Elton Road, Silver Spring, Md. 20903. Also being held March 8-9 in Los Angeles and March 15-16 in Washington, D.C.

MARCH 1-2, LOS ANGELES — **Micro/Personal Computer Operating Systems (Unix, Xenix, MS-DOS, CP/M, Etc.).** Contact: Software Institute of America, 339 Salem St., Wakefield, Mass. 01880.

WEEK OF MARCH 4

MARCH 4-7, LOS ANGELES — **Expo '84, Electronic Banking Conference and Equipment Exposition.** Contact: The Bankers Institute, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

MARCH 5, RALEIGH, N.C. — **Structured Systems Development.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5, WASHINGTON, D.C. — **Introduction to Micros.** Contact: U.S. Professional Development Institute, Microcomputers in Government, Department AB, 1620 Elton Road, Silver Spring, Md. 20903. Also being held March 12 in Denver, March 19 in New York and March 26 in Seattle.

MARCH 5-6, ORLANDO, FLA. — **CICS/TX Design.** Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

MARCH 5-6, LOS ANGELES — **Local-Area Networks: Selection Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 5-6, NEW YORK — **CICS/VS Testing and Debugging.** Contact: Data Base Management, Inc., 1075 Tolland Tpk., Manchester, Conn. 06040.

MARCH 5-6, ROCHESTER, N.Y. — **Operating Systems for Personal Computers.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

MARCH 5-6, ST. LOUIS — **Supporting and Maintaining the Data Communications Network.** Contact: Data-Tech Institute, 386 Franklin Ave., P.O. Box 569, Nutley, N.J. 07110. Also being held March 12-13 in Orlando, Fla., March 19-20 in Princeton, N.J., and March 26-27 in Stamford, Conn.

MARCH 5-7, NEW YORK — **Computer Phobia?** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020. Also being held March 5-7 in Los Angeles, March 19-21 in Boston and March 26-28 in Chicago.

MARCH 5-7, DES
See MARCH page 32

THE MICRODATA 1000 REDEFINES THE MANAGEMENT WORKSTATION.

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NEWS

MARCH from page 31

MOINES, IOWA — **Systems Project Management.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 5-7, WASHINGTON, D.C. — **Decision Support Systems.** Contact: U.S. Professional Development Institute, Decision Support Systems, Department K, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 5-7, ENGLEWOOD CLIFFS, N.J. — **VM Systems Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MARCH 5-7, NEW YORK — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

MARCH 5-7, CHICAGO — **Intro-**

duction to Data Communications. Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015. Also being held March 5-7 in Dallas, March 19-21 in Washington, D.C., and March 26-28 in Los Angeles.

MARCH 5-7, NEW YORK — **Data Communications: An Introduction to Concepts and Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 5-7, NEW YORK — **Computer Contracts.** Contact: Joanne Flynn, Brandon Consulting Group, Inc., 1775 Broadway, New York, N.Y. 10019.

MARCH 5-7, CHICAGO — **Data Communications for Microcomputers: Acquisition, Application and Implementation.** Contact: Datapro Research Corp., 1805 Underwood

Bldg., Delran, N.J. 08075.

MARCH 5-7, NEW YORK — **Network Management and Control.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

MARCH 5-7, DALLAS — **Managing Application Software Support.** Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94026.

MARCH 5-7, NEW YORK — **Data Communications: Network, Design and Optimization.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 5-7, WASHINGTON, D.C. — **X.25 and Packet-Switching Networks.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

MARCH 5-7, WASHINGTON, D.C. — **Structured Technologies in**

Software Testing. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

MARCH 5-7, DENVER — **Office Automation: Strategic Planning, Design and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

MARCH 5-7, WASHINGTON, D.C. — **Data Communications System Components.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015. Also being held March 28-30 in Atlanta.

MARCH 5-8, DALLAS — **IMS/VS Application Development Facility II.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

MARCH 5-8, PHOENIX — **The Fifth Annual Conference on DP Performance Management.** Contact: Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

MARCH 5-9, BOSTON — **Information Modeling Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 5-9 in Dallas.

MARCH 5-9, WASHINGTON, D.C. — **CICS/VS Command-Level Programming.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

MARCH 5-9, DENVER — **Structured Analysis and System Specification Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 5-9 in Honolulu.

MARCH 5-9, ORLANDO, FLA. — **Managing the Audit of Computer-Based Bank Systems.** Contact: Darlene Flooding, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

MARCH 5-9, CHICAGO — **Structured Design Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held March 5-9 in Houston.

MARCH 5-9, RICHMOND, VA. — **Systems Analysis Workshop.** Contact: Brandon Systems Institute, 4720 Montgomery Lane, Bethesda, Md. 20814.

MARCH 5-9, LONG BEACH, CALIF. — **Advanced Structured Analysis.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5-9, PORTLAND, ORE. — **Structured Systems Analysis and Design.** Contact: Hudson Henry and Associates, Inc., 4526 S.E. Kelly, Portland, Ore. 97206.

MARCH 5-9, PHILADELPHIA — **Structured Analysis and Design Workshop.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

MARCH 5-9, PHILADELPHIA — **CICS Command-Level Applications Programming.** Contact: Compel Technical Corp., 10 E. 21st St., New York, N.Y. 10010.

MARCH 5-9, HONOLULU — **Structured Analysis for Real-Time Systems.** Contact: J. Baldwin, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

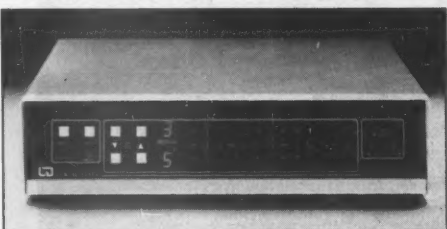
MARCH 5-9, ORLANDO, FLA. — **IDMS-DC Programming.** Contact: Harris Education Center, 6220 S. Orange Blossom Trail, Orlando, Fla. 32809.

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IN DEPTH



Lessons from the best-sellers

A three-part series

By J. Daniel Couger

The information systems manager who succeeds in the "megatrend era" will be the one who balances the technical with the behavioral — recognizing employee needs for a high-touch, participatory working environment.

We are living in a time of parentheses, according to John Naisbitt, author of the best-seller *Megatrends*. It is the time between eras.

"Amid the sometimes painful and uncertain present, the restructuring of America proceeds unrelentingly," he writes. Nevertheless, "We have not quite left behind the either/or America of the past — centralized, industrialized and economically self-contained. We are clinging to the known past in fear of the unknown future."

Naisbitt's Washington, D.C.-based consulting firm conducts research on social, economic, political and technological movements in the U.S. Among his clients: AT&T, United Technologies Corp., Control Data Corp. and Atlantic Richfield Co.

Megatrends (Warner Books, \$17.50; paperback, \$8.95) identifies 10 "restructurings" in defining the new society. These trends will significantly affect information systems managers.

I have summarized the Naisbitt book in two categories: 1) macroanalysis — the key points underlying each megatrend and their impact on each of us as mem-

bers of society and 2) microanalysis — the primary effects on the information systems field. This analysis reveals that for the first time, systems managers have the opportunity to move from a *supportive* role to a *lead* role in taking their companies from the industrial to the information era.

Naisbitt's research group used a trend extrapolation methodology consisting of three components:

1) **Content analysis.** Based on a technique used by intelligence agencies during World War II, this approach measures the contents of newspapers. About 6,000 newspapers, both U.S. and foreign, are examined each month. Content analysis effectively monitors social change because the news hole is a closed system. When something new is introduced, something else must be omitted.

2) **Analysis of activities in bellwether states.** In interpreting its research data, the Naisbitt group "learned that there are five states in which most social invention occurs in this country;

Part two

IN DEPTH/DP MEGATRENDS

the other 45 are, in effect, followers." The key indicator state is California, with Florida a close second. The other three trend-setting states are Washington, Colorado and Connecticut.

3) **Extrapolation.** "Trends, like horses, are easier to ride in the direction they are already going," Naisbitt says. "You may decide to buck the trend, but it is still helpful to know it is there."

Examining the megatrends

Megatrend No. 1: *Although we continue to think we live in an industrial society, we have, in fact, changed to an economy based on the creation of information.*

For the first time, our economy is based on a key resource that is not only renewable but self-generating. The telephone, computer and television have merged into an integrated communications system that will fuel the information society the way energy — electric, oil, nuclear — kept the industrial society humming and the way natural power — wind, water and brute force — sustained agricultural society.

For example, between 6,000 and 7,000 scientific articles are written each day. The amount of scientific and technical information now increases 13% per year, which means it doubles every 5½ years. But the rate will soon jump to perhaps 40% per year because of new, more powerful information systems and an increasing population of scientists.

That means the data will double every 20 months.

In the information society, we have systematized the production of knowledge and amplified our brainpower. To use an industrial metaphor, we now mass-produce knowledge, and this knowledge is the driving force of our economy.

Computer skills will be needed in up to 75% of all jobs by 1990. Being without computer skills is like wandering around the Library of Congress with all the books arranged at random, with no Dewey decimal system, no card catalog and no friendly librarian to serve your information needs.

Megatrend No. 2: *We are moving in the dual direction of high tech/high touch, matching each new technology with a compensatory*

human response.

When we moved from an agricultural to an industrial society, we moved more industry into our farms. In about 1800, 90% of our population produced 100% of the food. Today, only 3% of the population produces 120% of the food we need.

We will increasingly run our factories with information rather than laborers. Robots will play a big role. Conservative estimates predict that by 1990 we will be producing 17,000 robots per year and that the total robot work force will reach 80,000. Most experts would double those figures.

We must learn to balance technology with human spiritual demands. Indeed, something else has been growing alongside the technological invasion. For example, as hospitals become environments of fluorescent lights, stainless steel and computers, home births are growing more common and an increasing number of chronically ill patients are choosing hospice care. The more technology we introduce into society, the more people will want to be with other people.

Megatrend No. 3: *No longer do we have the luxury of operating within an isolated, self-sufficient, national economic system; we must acknowledge that we are a part of a global economy.*

Sweden, Denmark, Norway and Switzerland now lead the U.S. in per capita income. Third World nations have entered phenomenal boom cycles. Over the next decade, we will see a number of new "Japans." The 20 fastest growing economies for the period between 1970 and 1977 were all Third World countries. Some were oil-exporting countries — Saudi Arabia and Iran, for instance. But the vast majority were not. Botswana's economy grew at an annual average of 15.8% and South Korea's at nearly 10%. The economic powers of the Third World are growing with purpose and design: South Korea, Taiwan, Brazil and Singapore invested between 25% and 35% of their gross national products in their economies, nearly twice the rate of the U.S.

During the past decade, the Third World has begun to take up most of the world's industrial tasks. By the year 2000, Third World countries will manufacture as much as 30% of the world's goods.

Rather than reinvest in the industries that once made this country, the U.S. must move toward enterprises of the future.

Megatrend No. 4: *We are restructuring from a society run by short-term considerations and rewards in favor of dealing with things in much longer time frames.*

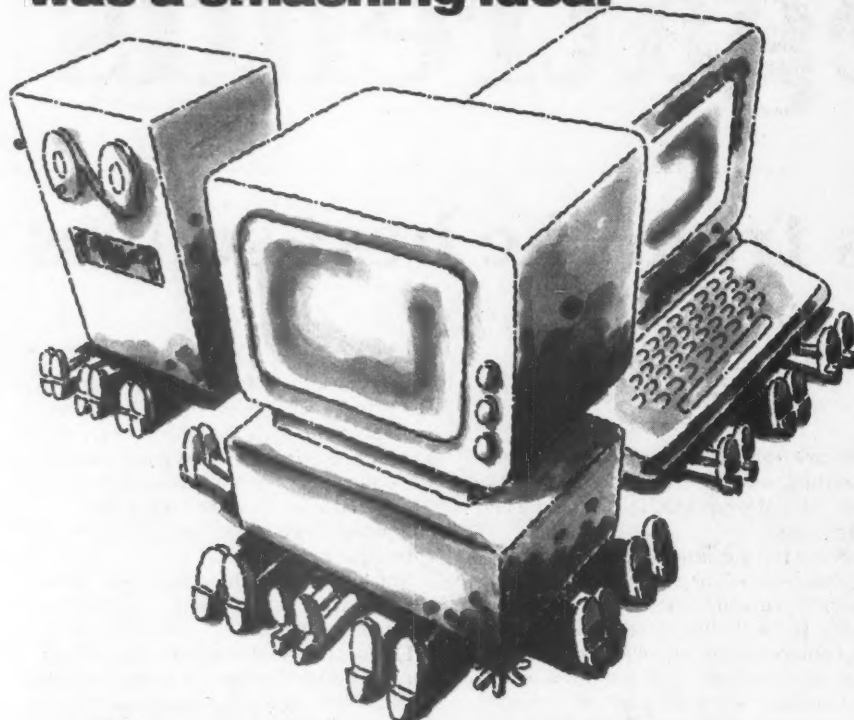
"Get me through the next election or the next board meeting" seems a prevalent attitude, with the result that American government and industry suffer a kind of tunnel vision and find it hard to change.

The criticism about short-term management is becoming widely accepted by the business community itself. Of nearly 1,000 top executives surveyed recently by the Chicago management research firm, Heidrick and Struggles, 76% said there has been a damaging overemphasis on immediate financial goals.

The question for the 1980s is, "What business are you really in?"

Megatrend No. 5: *In cities and states, in small organizations and subdivisions, we have rediscovered*

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IN DEPTH/DP MEGATRENDS

the ability to act innovatively and to achieve results from the bottom up.

Our society is converting from centralization to decentralization. Centralized structures are crumbling across our country. But society is not falling apart. People are building the country into a stronger, more balanced, more diverse society. It doesn't matter who is president, and Congress has become obsolete. Local initiatives attract intense political activity, and real political power — that is, the ability to get things done — has shifted to the states, cities, towns and neighborhoods.

Megatrend No. 6: We are shifting from institutional help to more self-reliance in all aspects of our work.

For decades, institutions such as the government, the medical establishment, the corporation and the school system were America's buffers against life's hard realities (the needs for food, housing, health care, education). Slowly we began to wean ourselves from our collective institutional dependence, learning to trust and rely only on ourselves.

In a sense, we have come full circle. We are reclaiming America's traditional sense of self-reliance after four decades of trusting in institutional help. No one believes anymore that institutions can care for us as well as we can do things for ourselves, with the result that we are increasingly disposed to manage our own lives.

Megatrend No. 7: We are discovering that the framework of representative democracy has become obsolete in an era of instantaneously shared information.

Participatory democracy is revolutionizing local politics in America and is bubbling upward to change the course of national government as well. Initiatives and referenda are tools for the new democracy. In 23 states and 100 cities in which initiatives are legal, voter turnout is 20% higher than in states without such voter options.

Political scientist Harlan Cleveland wrote on the power of participatory democracy: "The tidal wave of social change these past 20 years — environmental sensitivity, the demographic transition, civil rights for all races, the enhanced status of women, recognition of rights of consumers and small investors — was not generated by the established leaders, but boiled up from the people at large."

Megatrend No. 8: We are giving up our dependence on hierarchical structures in favor of informal networks.

The pyramidal power structures in which people at the top give the orders are

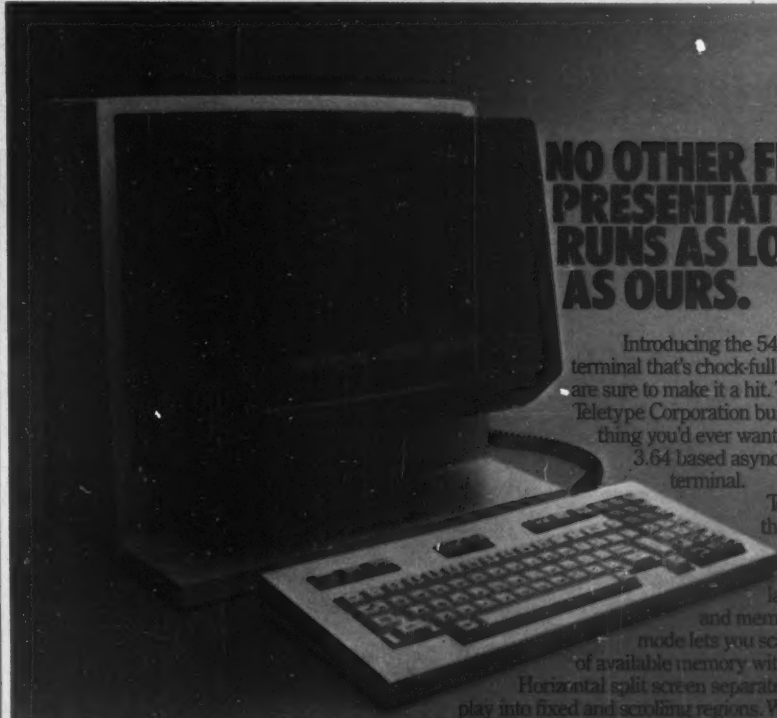
being superseded by networks: people talking to each other, sharing ideas, information and resources. The point is often made that networking is a verb, not a noun. The important part is not the network, the finished product, but the process of getting there — the communication that creates linkages between people and clusters of people.

Vehicles for networking include phone calls, air travel,

books, phantom organizations, papers, pamphleteering, photocopying, lectures, workshops, parties, grapevines, mutual friends, summit meetings, coalitions, tapes, newsletters.

"Networks are appropriate sociology — the human equivalent of appropriate technology — providing a form of communication and interaction that is suitable for the energy-scarce, information-rich future of the

Networks offer what bureaucracies can never deliver — the horizontal link. This connection is enormously liberating for individuals. Hierarchies promote moving up and getting ahead, producing stress, tension and anxiety. Networking empowers the individual, and people in networks tend to nurture one another.



NO OTHER FEATURE PRESENTATION RUNS AS LONG AS OURS.

Introducing the 5420, an editing terminal that's chock-full of features that are sure to make it a hit. That's because Teletype Corporation built it to be everything you'd ever want in an ANSI 3.64 based asynchronous terminal.

To begin with, there are four ways to access and manipulate the display and memory. Scroll mode lets you scan all 72 lines of available memory with the display.

Horizontal split screen separates the display into fixed and scrolling regions. Windowing

divides the display into as many as four viewports and workspaces that let you process groups of data simultaneously. Page mode makes the terminal perform as if it were three.

Another example of the amazing value the 5420 represents, is that it lets you change from an 80 to 132 column mode to put more data — including accounting spreadsheets — on display.

In addition to eight system defined function keys that can be down-line loaded from a host, you get eight non-volatile user defined function keys that can be entered locally. All 16 function keys are easily associated with screen labels. When the function of these keys is changed, the screen labels can change right along with them. And a variety of local terminal features can be accessed through the screen labeled keys.

As if that's not enough, there's an English menu for fast set up when optioning. The 5420 is also buffered so you can send a character, line or page of data at a time. Plus, you get character, word and line insert/delete. A bi-directional, buffered EIA printer port is standard.

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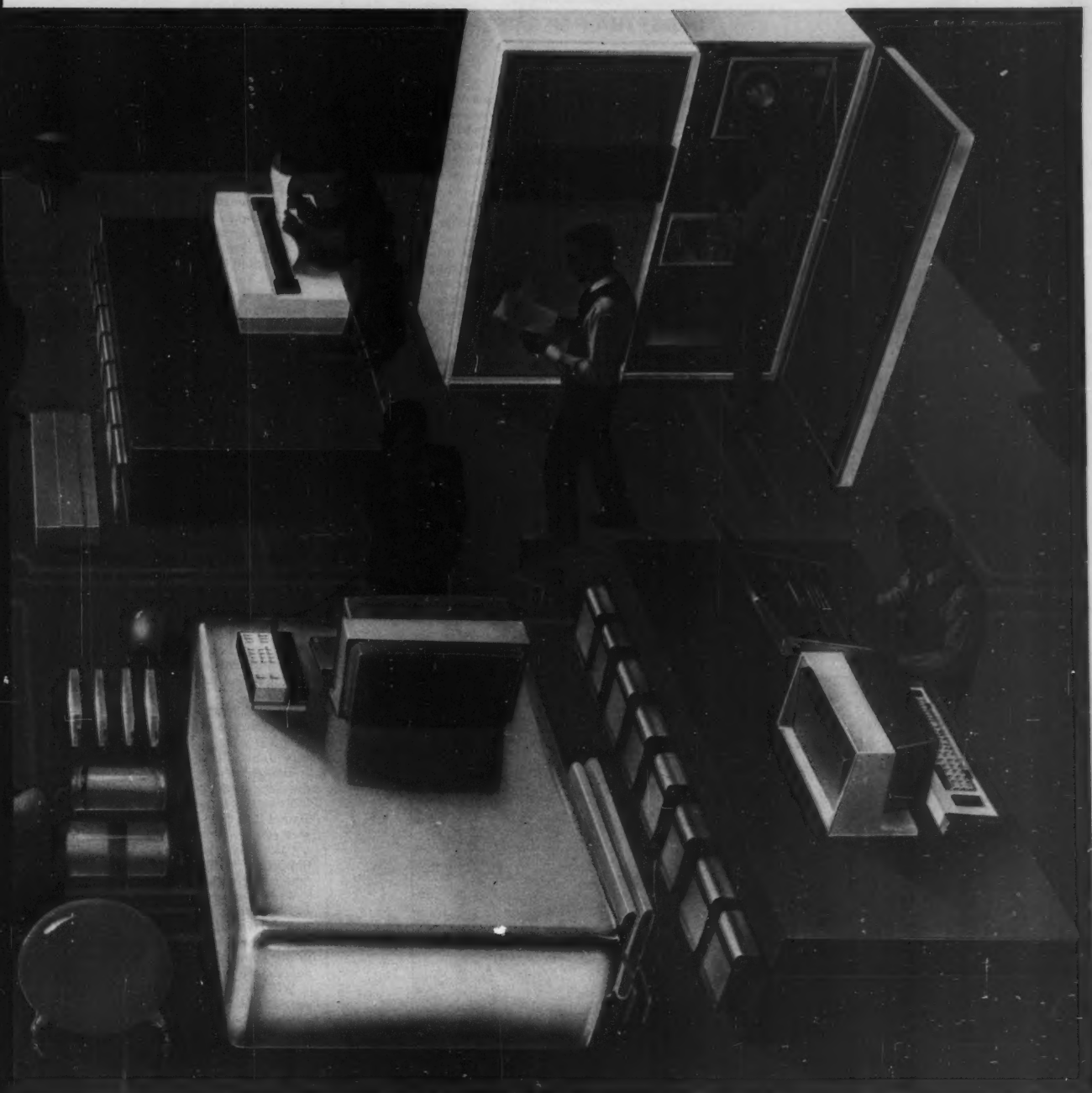
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IN DEPTH/DP MEGATRENDS

1990s and beyond," write Jessica Lipnack and Jeffrey Stamps in *New Age*.

Experienced networkers claim they can reach anyone in the world with only six interactions. Naisbitt claims he can reach "anyone in the U.S. with only two — three at the very most — exchanges." Although sharing information and contacts is their main purpose, networks can go beyond the mere transfer of data to the creation and exchange of knowledge. As each person in a network takes in new information, he synthesizes it and comes up with new ideas.

Networks offer what bureaucracies can never deliver — the horizontal link. This connection is enormously liberating for individuals. Hierarchies promote moving up and getting ahead, producing stress, ten-

sion and anxiety. Networking empowers the individual, and people in networks tend to nurture one another.

Megatrend No. 9: More Americans are living in the South and West, leaving behind the old industrial cities of the North.

The old economic axis between New York and Chicago is being replaced by a new Los Angeles-and-Houston axis. Perhaps more important than the political or demographic changes is the economic growth that supported and encouraged the population shift.

Two out of three new jobs were created in the Sunbelt or western states between 1968 and 1978. The U.S. Labor Department calculates that the Northeast and Midwest gained only 6.1 million to the South

and West's 12.3 million.

Megatrend No. 10: From a narrow either/or society with a limited range of personal choices, we are exploding into a freewheeling multiple-option society.

There are more than 752 models of cars and trucks sold in the U.S.; one store in New York stocks 2,500 types of light bulbs. The basic idea of the multiple-option society has spilled over into other important areas of our lives: religion, the arts, food and, finally, in the extent to which cultural, ethnic and racial diversity are now celebrated in America.

More than ever before, people live alone — one in four is a single-person household, compared with one in 10 in 1955. Single-person households are so numerous that the

basic building block of society may become the individual rather than the family.

Effects on MIS

1. Industrial society is becoming an information society. We are drowning in information but starved for knowledge.

This level of information is clearly impossible to handle by present means. Uncontrolled and unorganized information is no longer a resource in an information society. Instead, it becomes the enemy of the information worker. Scientists who are overwhelmed with technical data complain of information pollution and charge that it takes less time to do an experiment than to find out whether or not it has already been done.

Information technology brings order to the chaos of information pollution and, therefore, gives value to data that would otherwise be useless. If users, through information utilities, can locate the information they need, they will pay for it. The emphasis of the whole information society shifts, then, from supply to selection.

This principle is the driving force behind the new electronic publishers who provide on-line data bases, communications channels for sorting and selecting. These new businesses are selling a medium, not information as such.

In an industrial society, the strategic resource is capital; 100 years ago, many people may have known how to build a steel plant, but few could get the money to do it. Consequently, access to the system was limited. But in our new society, as Daniel Bell first pointed out, the strategic resource is information — not the only resource, but the most important. With it, access to the economic system is much easier.

2. Forced technology is becoming high tech/high touch. High-tech robots and high-touch quality circles are moving into our factories at the same time — and the more robots, the more circles.

When high tech and high touch are out of balance, conflict results. Concern about personal privacy erupted just as computer systems became widespread in society.

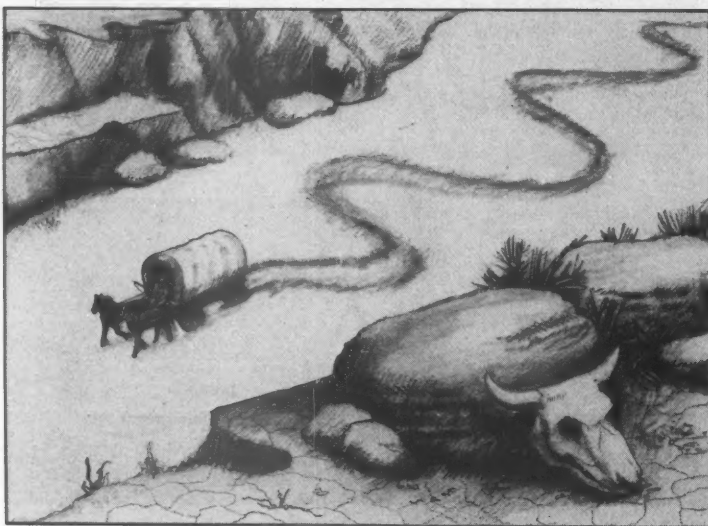
Whenever institutions introduce new technology to customers or employees, they should build in a high-touch component. If they don't, people will try to create their own or reject the new technology.

3. The national economy is becoming a world economy. We have two economies in the U.S. today: a sunrise economy and a sunset economy.

As the Third World prepares to take over the major industrial tasks, the developed countries must move on to the new enterprises. We are in the midst of doing that right now. In the industrialized nations, we have two separate economies: sunrise and sunset industries. This dual economy has caused much confusion in analyzing our economic situation.

What sort of structural-adjustment policy would work best in this country? Generally speaking, the government should stay out of the way of the sunrise industries (electronics, software, cable television, biotechnology) and allow the mature industries to level off.

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IN DEPTH/DP MEGATRENDS

Of course, sunrise industries will not account for all future growth. Established businesses, where we are still competitive and where demand remains strong, will continue to grow: aerospace, all of the information processing and telecommunications industries, health care and medical technology.

Information will be the new economic good, and as of now, at least, the U.S. is the world's leading supplier of information. But America has no manifest destiny to maintain its lead.

Despite some worker opposition, factory automation continues. There are only about 1,000 robots in the U.S. auto industry today, but they

are earning their keep and gaining a reputation for productivity as well. Quality robots that cost \$50,000 each can work two shifts a day for eight years. That figures out to about \$5 per hour — quite a bit less than the typical \$15 per hour for an auto worker's salary and benefits.

Instead of constantly bemoaning the loss of the old industries, we must explore the adventurous new technologies: electronics, biotechnology, alternative energy sources, mining of the seabeds and robotics. Ten years from now, the electronics industry will be bigger than the auto and steel industries are today. The U.S. alone will need a million or more programmers by the end of the decade.

4. Short-term approaches are turning to long-term. We must reconceptualize what business we are in, or conceptualize what business it would be useful for us to think we are in. Furthermore, when the situation is constantly changing, the process of reconceptualization must itself be constant.

The word "process" should be emphasized. It is not something bought from the outside, but something that occurs inside an institution (with influence and instruction from what is going on outside). It is the hard work of colleagues rigorously questioning every aspect of an institution's purpose — and questioning the purpose itself. The purpose must be right, and it must be a shared vision, a strategic vision.

Strategic planning is worthless unless there is first a strategic vision. A strategic vision is a clear image of what you want to achieve, which then organizes and instructs every step toward that goal. The extraordinarily successful strategic vision for the National Aeronautics and Space Administration was, "Put a man on the moon by the end of the decade." That vision gave magnetic direction to the entire organization. Nobody had to be told or reminded of where the organization was going. Contrast the organizing focus of put-

ting a man on the moon by the end of the decade with, "We are going to be the world leader in space exploration."

In a constantly changing world, strategic planning is not enough; it becomes planning for its own sake. Strategic planning must be geared to a strategic vision with a clarity that remains in spite of the confusion natural to the first stages of change.

5. Centralization is giving way to decentralization. By 1976, America's 200th anniversary, we had turned the corner: The growing strength of the decentralization trend surpassed the receding tendency to centralize. Yet the pull of decentralization extends far beyond politics and geography. It is structuring the transformation of social relationships and social in-

stitutions as well.

Decentralization creates more opportunities and more choices for individuals. Because business is decentralized, you can find a job close to where you want to live in a rural area — or almost anywhere else. Your home computer and word processor will enable you to work at home in an isolated area if you are one of the few who takes that course. On the other hand, the cities that some leave will become less crowded and more pleasant for the others who stay.

6. Institutional help is being replaced by self-help. The macroeconomics of the industrial-welfare state is yielding to the microeconomics of the information self-help society. We are shifting from a managerial society to an entrepre-

neurial society.

Somewhere between the shift from institutional help to self-help comes the question, "Can I really do it on my own?" For some people, there is a crisis of confidence, a fear that one is not yet up to the challenge of self-help, perhaps a desire to cling to the comfort of depending on others. Others are very assertive about taking care of things themselves.

Whether we like it or not, self-help fits the political and economic mood of the country.

7. Representative democracy is yielding to participative democracy. The new leader is a facilitator, not an order giver.

Any number of issues can be termed "workers' rights" — privacy, due process (in any dismissal



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IN DEPTH/DP MEGATRENDS

action), free speech, protection in whistle blowing, participation in management, flexible work contracts, equal pay for work of comparable value or an employee newspaper that is free to take on management. But the first four issues are most readily recognized as crucial. Citizens possess the first three rights outside of work, and people generally agree that it is highly unjust to penalize a worker for speaking out against illegal or immoral behavior on the part of his employer.

The Naibitt study signals a powerful mismatch between workers and the way they are treated on the job. Now, workers are better educated, more self-confident about governing themselves (in politics and at work) and, consequently, more likely to de-

mand fair treatment. At the same time, they feel they are being treated less fairly than workers in the 1950s.

The need, then, is for leaders (managers) who can facilitate employees' involvement in decision-making processes.

3. Hierarchies are "out," networking "in." Network-style management, now evolving, will be rooted in informality and equality; its communication style will be lateral, diagonal and bottom-up.

From Sweden comes a vision of the future corporation as a confederation or network of entrepreneurs. Employees who function as entrepreneurs are called intrapreneurs by the Foresight Group, which has created a school in Filipstad, Sweden, to teach intrapreneurship to both em-

ployees and corporate managers.

The main idea is to reverse the creative inertia in many large corporations by developing the *inside* entrepreneur. The Foresight Group believes there are a lot of good ideas within organizations for new businesses.

The company that can learn how to get people to actualize those ideas will have tapped a gold mine.

Both parties profit: The intrapreneur gets the company's good name, contacts, resources and money. The company keeps a creative person who may otherwise leave to start a new business and gains the potential to develop a profitable new in-house business.

9. The North-South shift is presenting a crisis in infrastructure, which will eventually force both

North and South to reexamine economic goals and purposes.

For the skilled and the mobile, and especially the young, the cities represent the promise of continued growth and prosperity. But what are the prospects for the unemployed in the North? Moving to the Southwest is an option many have taken. But if a person doesn't want to move, he must adapt by acquiring skills in a sunrise industry operating in his area. Life choices are no longer either/or.

Cities in the North are undergoing dramatic change. Manhattan will continue to be an important information-switching station for the world, while the four boroughs around it

Systems managers have the knowledge and opportunity to assume the key role in facilitating their firms' transitions from the industrial to the information era. They can help management formulate a strategic vision and convert it to a strategic plan.

decline. Lowell, Mass., the birthplace of the industrial revolution in America, has lost its industrial base, but it is today the world headquarters for Wang Laboratories, Inc., one of the leaders in the information society.

10. Either/or society is becoming a multiple-option one. You can tell you are being educated if your options are increasing and that the reverse is happening if they are decreasing.

Similarly, a society can tell it is growing if the options for its citizens are increasing. It is extraordinary for a society as mature as the U.S. to be growing — at least by this measure — so vigorously. Soviet bloc countries are stagnant by comparison.

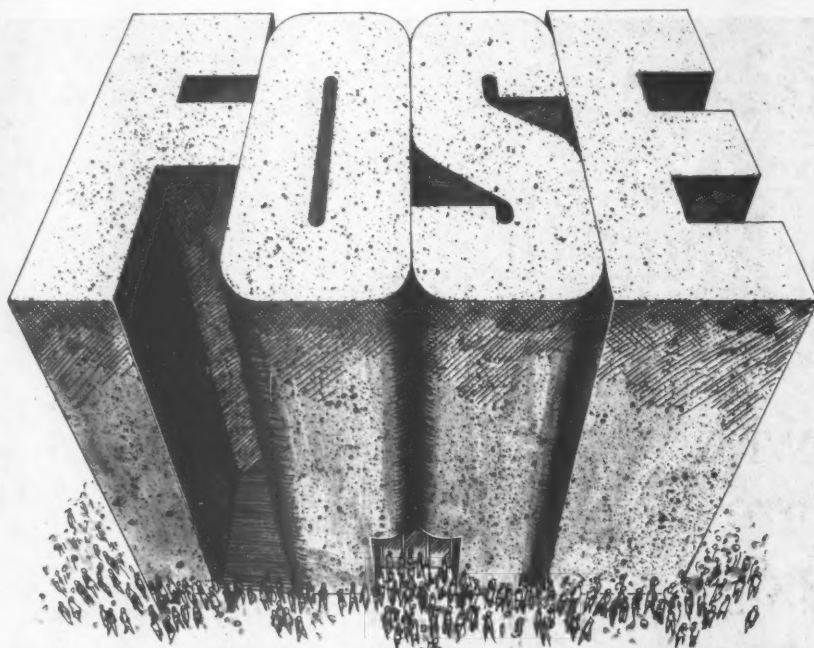
Much of the multiple-option nature of the U.S. is addressed to our own individuality. We have greater and greater opportunities for self-expression — in education, religion and the arts, in our work as well as in the marketplace.

Information systems managers have the knowledge and the opportunity to assume the key role in facilitating their companies' transitions from the industrial to the information era. They can aid company management in formulating a strategic vision and then converting it to a strategic plan. This effort will be less than successful without equal attention to the other megatrends, such as the behavior consequences of the information era.

About the author

J. Daniel Couger holds the title Distinguished Professor of Computer and Management Science at the University of Colorado, Colorado Springs. He has lectured in more than 50 countries and written 15 books and more than 60 papers.

Prior to his academic appointment, Couger served as a manager in the computer field. In 1977, he was named U.S. Computer Science Man of the Year.



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EDITORIAL

No. 2? Stay tuned

If you can't be No. 1, the next best thing is to solidify your position as No. 2. And that is exactly what Apple Computer, Inc. has done.

Everyone knows Apple has a new microcomputer, the Macintosh. And just about everyone also knows that Apple's future as a competitor in the microcomputer business hinges on the Macintosh.

Why? Because for months, in numerous interviews with the media and in its advertising, Apple has been drumming it into our heads.

And the approach has worked. Apple appears to have emerged from the pack of 150-plus microcomputer vendors as the challenger to IBM.

But let's put the marketing hype aside for a moment. Most industry watchers agree the microcomputer market is headed for a big shake-out, and vendors that do not offer a unique, identifiable product are clearly headed for trouble.

Amidst this turmoil in the microcomputer industry, Apple has boldly staked its claim as the No. 2 vendor. The move is bold because a year ago Apple's hot new product, the Lisa, flopped. Its critics said the machine was too expensive, too slow and did not offer precious IBM compatibility.

Some critics went so far at the time as to predict Apple's demise. Now, Apple appears to be back in the running with a faster, cheaper version of the Lisa (although, at least for the moment, it still does not offer IBM compatibility).

Why does Apple appear to be a tougher contender today than it was a year ago? Because today Apple is doing a better job of hyping its products — a lesson learned from the master of hype, IBM, which had the industry abuzz over what the Peanut would look like.

But Apple dispensed with the secrecy and told everyone the details of the Macintosh while still maintaining an aura of mystery. Will the Macintosh make it? Will Apple announce IBM compatibility? Will Apple survive?

Those questions may not be answered for a while. Perhaps during next year's Superbowl! Stay tuned.



LETTERS TO THE EDITOR

Value range not meant to be interpreted as damage claim: IBM

Computerworld's coverage of IBM's settlement with National Semiconductor Corp. and its subsidiary, National Advanced Systems, Inc. ("IBM, NAS settle case," CW, Jan. 16), misleads your readers about damages purportedly sought by IBM.

It is the value to IBM of the trade secrets obtained by National Semiconductor/National Advanced Systems — not IBM's damages — which was estimated to be between \$750 million and \$2.5 billion.

At no time was that value range meant to be interpreted as a damage claim.

We stated many times — in our amended complaint, in the courtroom and in a press release on Dec. 2, 1983 — that reports of high damage claims were in error.

IBM's primary objective was to obtain the in-

junctive relief necessary to protect against misappropriation and misuse of IBM trade secrets and confidential information. We stated clearly that the amount of damages was unknown and that if the defendants had not used the information and had not distributed it to others, damages would be minimal, if any.

Edward Nanas
Director of Information
Office of Director of Information
IBM
Armonk, N.Y.

Big Blue not alone in maintaining compatibility within product line

It was with interest and a discriminating eye that I read your article, "An IBM Look at the History of Computers" [CW, Dec. 26/Jan. 2].

I take strong exception to a statement at the close of the text: "Not coincidentally, the 370 also capped an effort begun with the company's 360 series to make all its equipment compatible — yet another concept that IBM pioneered."

To say that this statement is inaccurate is a kindness. It is, in short, misleading. It leaves the reader with the impression that IBM's product line is compatible between series, when anyone who has gone through the arduous task of conversion can tell you that this simply is not the case.

I know of only one of the major vendors that has maintained compatibility across its line of computer processors, and that vendor is Burroughs Corp., not IBM. Burroughs has not only taken great pains to establish compatibility within its product line, but has also managed to accomplish this same feat within the different generations of its computers.

To imply, therefore, that it is IBM that deserves accolades for this concept is to do a disservice to your readers and to Burroughs.

John R. Volters
Dayton, Ohio

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VIEWPOINT

Pundits and predictions

LECHT ON SCIENCE

CHARLES P. LECHT

Getting the "right stuff" — the slowdown on what's happening in the computer industry, the information needed to create a credible and enduring plan for corporations gone electronic — is becoming increasingly difficult. Without it, planners and management have little hope of controlling their overall operating costs, a growing portion of which is for technology. Where the user community can look to find the right stuff is the subject of today's whimsy.

At the start of each New Year, the business of getting out annual forecasts of computer industry events consumes the time of corporate planners, financial analysts, manufacturers' strategists, research institutions and just about anyone else with crystal balls big enough to dare try to see into our computer future.

Pundits one and all each must vault the abyss between what is and what will be in their annual showpiece forecasts, then live with the reward or shame that these may bring. The former involves praise and money; regarding the latter, a year-long chorus of the hee-haws and cat calls from a balcony of Italian opera critics on hearing the croak of a diva's diving voice just begins to suggest the kind of ridicule possible.

The user/purchasing community is the ultimate benefactor of the accurate results of our pundits but, my friends tell me, these are increasingly useless these days: When our industry analysts reach consensus on a matter, it's usually unimportant;

when their opinions are scattered all over the lot, a key issue is invariably involved.

For example, I've seen forecasts of between two and five million personal computers to be sold in 1984 from some highly reputable sources. When the cream of our computer-analyzing community cannot come up with an answer to this question with less than a 150% difference in result, something is amiss. If these figures came out of our purveyor community we might not be so surprised; we are naturally quite skeptical of their prognostications, betting that whatever they may proffer is tarnished by self-interested motives.

But when emanating from the best and brightest of nonaligned analysts, it's rather frightening. A grade-school lab teacher would flunk any student turning in measurements so deviant. And December 1983's sales of home computers and software so far exceeded that forecasted that we can only conclude that when it was made our pundits were out to lunch.

Pundits' fantasies

Divining the business plans of our most successful technology contenders — by deduction or otherwise — must be the objective of every persevering pundit. The megabucks poured into creating these by our industry's preeminent companies frequently exceed the totaled sales of their second-tier competitors. Where can we expect to find better information or more accurate verification than in their own forecasts? But acquiring these legally — that is, through respectable business practice — is nearly impossible. It's no surprise that every pundit worth his

salt has fantasies of somehow acquiring the business plans of IBM, AT&T or Motorola, Inc. That is the stuff of which dreams — and fortunes are made.

I stress "legally" because only the Lord knows how many analysts couldn't wait for their dreams to come true and hopped the barrier between ferreting and filching, hoping He wasn't watching. It's ironic that even if our major corporations wanted to give us their plans, the Justice Department and/or the Securities and Exchange Commission would inhibit this by accusing them of "information trafficking," thereby scaring the wits out of loquacious executives who may be willing to spill the beans.

More significant is the fact that the laws of business combat call for the wholesale outwitting of adversaries. These rules include not only secrecy but also the age-old practices of deception through camouflage and other such maneuvers. Thus, even if the right kinds of corporate information were freely issued, we still would have no way of knowing what was truthful.

Now don't misunderstand me; I do not mean to infer that the preponderance of corporate spokesmen routinely and purposefully misrepresent key information or shirk their duty by failing to provide us with the factual basis for believing it.

What I do mean is that today's public pronouncements on important technological issues suffer from increasing obscurity, perhaps the same confusion that characterizes our swiftly changing conception of what constitutes a computer system, be it big or little. My guess is that like most people these days, many ana-

lysts are no longer quite so sure. This may help to explain the wide variances in their predictions.

Quixotic quest

Lacking the resources of the big guys or the banditry of the bad guys, most pundits must rely upon their wits to obtain data from documents in the public domain and sources connected with the headquarters of our industry leaders. It is, therefore, not surprising that a typical day in the life of a typical pundit usually involves a quixotic quest for — the right stuff.

"How much was spent on programming in America last year?" a voice asks our typical pundit at 9 a.m. He doesn't know but offers to find out. He phones an analyst friend who promises to get back to him as soon as he calls an associate who's sure to have the answer. Before closing the conversation, the friend asks, rather sheepishly, if he is aware of how many persons programmed at least one line of code in 1983. He doesn't know — or care, for that matter — but he is now obliged to learn.

Our pundit calls a second friend for an answer to the question of the first. The second promises to answer our hero's question that afternoon — after receiving his pledge to obtain the total capacity of computer storage media produced in America between 1975 and 1980.

Now burdened with three unanswered questions, our pundit dials his Penultimate Source who refers him to an Ultimate Source — but only after receiving a commitment to find out whether gallium arsenide technology is becoming more popular

See PUNDITS page 45

Don't let your software get the best of your system

HUMAN CONNECTION

JACK STONE

As it has been all through the computer age, new software continues to open the doors to a world of exciting possibilities for productivity advances, as well as an accompanying galaxy of opportunities for misuse, counterproductivity and excessive costs.

With all the powerful hardware floating around, many tend to forget that the penalties in systems performance that must be endured to support increased functionality of certain software may not justify its acquisition.

This column is intended as a reminder that, in spite of plummeting hardware prices, software efficiency is a subject that cannot be ignored.

Excellent examples of this issue are found in word processing software where software inefficiencies are directly measurable in terms of extended time for hands-on sessions. Take, for example, the "speller" software that's all the rage in office circles.

Let's start with the capability of

viewing the context narrative of a mismatch word, that is, one that has no match in the master dictionary. One software package makes it mandatory that the operator view each word in context before selecting a disposition for it. On the face of it, this feature is very impressive, but it turns out that it not only slows down — way down — the spelling analysis, but it is also unnecessary in most cases because the writer/operator usually recalls the narrative from memory.

A better approach, used in several programs, is to make optional both the storage of contextual information during the initial spelling scan of the narrative and its display during the disposition phase of the mismatched words.

Personal dictionary

Another feature of spellers is the personal dictionary, which may be optionally concatenated to the master dictionary. Typical packages allow the operator to dispatch mismatch words directly to the personal dictionary, a choice that seemingly speeds its creation. This option, in my opinion, is a poor choice to select

because words assigned to the personal dictionary should not only be carefully checked for spelling errors before their entry but their alternate forms should be probed for in the master dictionary and included in the personal dictionary if necessary — a task that may be time-consuming. The point is that the effort involved in developing the personal dictionary should not be overlooked.

Then there's the "window" fad that's rapidly coming upon us. At first blush, it seems really neat to have "two to eight" files displayed together before your very eyes. However, if you have been fooling around with word processing at all lately, you would know that most of the time you want to devote the entire screen to text for simple entry and edit purposes.

A little experience with Micropro International Corp.'s Wordstar proves this: "Command Help" screens — a rudimentary form of window — occupy a good part of the display and cause considerable increases in scrolling time, plus plenty of distractions from the text edit process; its designers, of course, recognized this and provided commands to

suppress the Help screens.

Capacity confusion

And on the subject of Wordstar, one of its prominent features is that a document file is not restricted in size to random-access memory (RAM), but to the capacity of the disk storage. True enough, but what is meant is the "net" capacity of disk storage after allocating space for Wordstar's work files and the document backup file.

Even deleting the backup file, I couldn't save a 150K-byte file on a 296K-byte disk — not enough space. And with this size file and a small RAM, circa 48K bytes for me, I waited seemingly forever to get the cursor to move from the bottom to the top of the file, in stark contrast to the time for movement in a RAM-only file — as designed into certain software — which is negligible.

Software functionality is wonderful: Just be sure you don't forget what you are paying for it in terms of systems degradation or development expense. ‡

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.

VIEWPOINT

The real strengths of relational systems:

READER'S PLATFORM

E.F. CODD
C.J. DATE

The essence of William H. Inmon's In Depth article "What price relational?" [CW, Nov. 28], Inmon's principal message, in other words, is that "poor performance . . . is inherent to the relational environment." The argument presented in support of this conclusion is that relational systems will be running a mixture of planned transactions and ad hoc queries (short-running activities and long-running activities, to use Inmon's terms), and that those two kinds of activity are mutually disruptive.

Now it is true for any system (not just a relational one) that these two kinds of activity will tend to interfere with each other somewhat, and there is no harm in drawing attention to that fact. But to suggest that relational systems will, therefore, have significantly worse performance than less flexible (hierarchical or network) systems is completely unwarranted for at least the following two reasons:

■ First, it is an apples-and-oranges comparison. It is extremely difficult to perform any kind of ad hoc activity at all on hierarchical and network data bases, with the result that those systems are almost invariably (de facto) devoted to planned activities. This fact does not mean that users would not like to be able to perform ad hoc access to those data bases if they could.

■ Second, there is no requirement to mix the two kinds of activity in a relational system. It is ridiculous to suggest that "no . . . controls are imposed" in the relational environment. Of course such controls can be imposed, if the installation requires them. Even then, if such controls do prove necessary in certain installations, the user will still enjoy all the other advantages of relational technology (ease of use, speed of application development, resilience to change and so on) and in addition will be able to perform ad hoc access at controlled times. Furthermore, there will be many installations where such controls will not be necessary, because the overall performance requirements will be less stringent. Control vs. performance is a trade-off like any other.

Inmon makes a large number of specific but unsubstantiated claims regarding the performance (actual or potential) of relational systems. He says that "a typical relational environment consists of many separate tables, none of which are physically connected," and that therefore the system has to "search for data in diverse places and [has to] construct relationships dynamically."

Such statements demonstrate a thorough confusion between the physical and logical levels of the system. Inmon seems to be unaware of — at least he makes no reference to — the many physical-level (implementation) facilities that have been provided in relational systems specifically for performance reasons. Those facilities include (but are not limited to) the following:

■ Physical data clustering (both intra- and intertable): Tables can be

physically connected or stored physically close to one another (even interleaved, as in a hierarchic or network system), if required — but they don't have to be. Note that physically separate tables are actually a better structure (from a performance standpoint) for many applications.

■ The optimization compiler technology pioneered in System R (and subsequently incorporated into the IBM products SQL/DS and DB2) means that a significant portion of the process of "searching for data and constructing relationships" is done statically, instead of dynamically, which thereby reduces the

amount of runtime I/O.

■ The provision of indexes and the ability to create and destroy indexes dynamically represent an important aspect of performance that is totally ignored in the article.

There are numerous additional errors of fact and judgment in the article. Some of the more egregious ones are as follows:

■ Inmon states that "resistance to the notion that relational systems do not perform poorly goes back to the relational movement itself . . ." He seems to be saying here that "the relational movement" (whatever that is) has always claimed that relational

systems do perform poorly. Surely that cannot be what he meant. More to the point, he goes on to say that "the relational movement is founded in a batch mentality." In fact, exactly the opposite is the case: The original intent was to make the data base directly accessible to *end users* (implying interactive access).

■ "Given the syntax of a language like SQL, it is very difficult, if not impossible, to separate requests" — that is, into long-running vs. short-running — "until runtime." Actually this is untrue, though it is true that systems today do not attempt to make such a separation.

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VIEWPOINT

Two experts review the performance issue

■ The "second operating system solution" (involving the temporary removal and subsequent reinstatement of long-running activities) is absurd and would not be worth discussing here at all, were it not for Inmon's final remark to the effect that the notion of "the standard work unit" is "violated at a most basic level by relational systems." This is arrant nonsense, as the most superficial examination of a system such as DB2 (for example) would immediately demonstrate.

■ "In Codd's original specification of the relational environment, it was specified that content-addressable

memory be used, rather than conventionally addressable memory." This is completely untrue. There was never any suggestion on the part of either of the undersigned that content-addressable memory was a prerequisite to good relational performance, and the success of modern relational systems (implemented on conventional memories) has shown that indeed it is not.

■ "Much has been said about user satisfaction, nearly all of it at the syntax level." It is absurd to suggest that the many benefits of relational systems — increased productivity, ability to prototype, direct end-user

access and so forth — derive exclusively from the syntax of the user language. To take one simple example, the fact that the relational user can dynamically join any number of tables without having to be aware of the physical representation of those tables in the data base, which is a significant ease-of-use and productivity factor, is certainly not a question of syntax.

The general tone of Inmon's article is reminiscent of the unfounded criticisms of stored-program computers that appeared when those computers were first under consideration as products. A typical claim at that time

was that sorting data on stored-program computers, for example, must inevitably be slower than sorting data using punched-card equipment.

Today, nobody would make any such claim. When a new technology is introduced, there is never any shortage of people ready to decry it; the absence of adequate knowledge of the technology in question does not seem to deter people from making such attacks. If the picture presented in Inmon's article were even close to the truth, is it likely that so many software vendors would be working so hard to provide relational products, and so many users would be so loudly demanding them? †

Codd, the original architect of the relational model, is an IBM Fellow in research. Date is an author, lecturer and consultant specializing in relational data base systems.

PUNDITS from page 43

than the Josephson Junction-based stuff for very high-speed integrated circuits.

Phoning the Ultimate Source, who holds him on the line while making a call, our indefatigable analyst learns the answers to the last two of his questions. With the requested figures cascading from his mouth like falling dominoes, he relays the newly acquired information to the Penultimate Source, then to the second person he called, who thereupon supplies him with an answer for the first person he called, who thereupon provides him with an answer to the original question.

To the original caller he triumphantly proclaims — "four billion dollars, give or take a hundred million" — gilding the lily of his day's success by asking if there is any other way he can be of assistance. "As a matter of fact," his friend replies, "I need to know which is preferred for use in very high-speed integrated circuits: gallium arsenide or Josephson Junction-based technologies?"

Our pundit is startled; the Ultimate Source had just given him the answer. He responds smugly: "Gallium arsenide, naturally. Everyone knows that." The caller thanks him, adding that he wanted to confirm the answer he'd just given to another friend — the friend was, of course, the Ultimate Source. And so it goes. Could anyone disagree that it's a hard-knocks life being a pundit prognosticator? His plight may be as pathetic, in fact, as that of the typical user of his prognostications. It's no wonder that all of the computer industry's punditry lives for the same fantasy. They dream of boarding a jet, reaching into the seat-pocket for the in-flight magazine and finding a portfolio in its stead. On it, big as life itself, are the words: "TOP SECRET: The IBM Corporate Plan, 1984."

Visions of a yacht in a Gallapagos lagoon inevitably end the dream. For this is indeed the stuff of which fortunes are made. The right stuff.

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

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Figure 1—User notes long response time for July 5, and enters "D" to generate degradation display in figure 2.



Figure 2—User observes that Private Page-In Wait is a problem and enters "R" to generate page dataset activity display in figure 3.

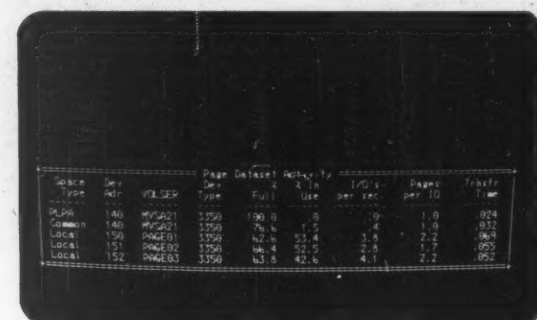


Figure 3—For detailed analysis of the paging resource, EPILOG/MVS shows statistics on both the page datasets and the DASD devices they reside on. This screen shows the cause of the problem: device contention causing very high busy rates on devices 150-152 which contain the local page datasets.

SOFTWARE & SERVICES

Will 1984 be Cincincom's year?

SOFTALK

PAUL GILLIN
CW Senior Editor

Look for 1984 to be a big year for Cincincom Systems, Inc. The Cincinnati-based vendor of systems software and the highly successful Total data base management system (DBMS) has been eerily quiet for the last two or three years. The reason is that it has been in a period of intensive research and development activity that is just beginning to show fruit, according to company officials.

Cincincom's recent announcement of a set of decision support applications based on the mainframe and a version of its Mantis application development system for the IBM Personal Computer XT/370 is the first of what could be a flurry of product activity from Cincincom this year.

The company will round out its manufacturing product line with a vendor analysis and purchase system, a \$1.5 million-line bear of an application that will give it a functionally complete offering in this area. We can also expect to see some general financial applications released this year, led off by an accounts receivable package. The move will put Cincincom into an increasingly crowded market that now includes some of its major competitors in the data base field.

Expect to see a kernel of the company's TIS data base product released as a relational DBMS in an effort to provide an upgrade path for current users of Total.

The kernel will include the underlying data base structure, In-Line Directory, physical data manager, Logical User View and directory; it will not include most of TIS's programming facilities.

The announcement would also be an attempt to help define a market for TIS, which is one of those rare products that can't be easily pigeonholed. Cincincom calls it an "integrated data base system," but the DBMS component only makes up about 10% of the TIS code. By re-

See CINCINCOM page 56

Vendor blasts HP users group Cites unfair rating

By Jeffrey Beeler
CW West Coast Bureau

AUSTIN, Texas — A local software supplier is threatening to sue a Hewlett-Packard Co. users group to protest the allegedly invalid results of a recent membership survey in which the vendor's main product received only lukewarm customer-satisfaction ratings.

Of the more than 60 survey respondents who evaluated the performance of Protos Software Co.'s fourth-generation programming language, only half are named in the company's master list of certified customers, according to Protos Vice-President Gary Simmons.

The rest of the respondents are apparently nonusers who generally expressed considerably more dissatisfaction with the product's operation than the bona fide customers and, thus, substantially lowered Protos' overall score, Simmons said.

In addition to contaminating the survey findings and casting doubt on the study's validity, the performance ratings have harmed the software company's sales and have provided advertising fodder for at

least one prime competitor, he complained.

"We already know of one person who wanted to buy our product and whose preference originally had the inside track," Simmons said. But opponents of the proposed purchase "seized upon the survey results and ultimately used them to shoot the acquisition down. There's no question in my mind that the impression the survey has left in some potential customers' minds has been a factor in their analysis of our product."

Concern about the survey's possible impact on Protos' sales prompted the firm last month to draft a letter demanding that the HP 3000 International Users Group revise the disputed findings and print the changes in its monthly magazine, *Interact*. But thus far, the demand has failed to produce the desired result.

"The information we released in our survey is exactly what we initially said it would be — our members' opinions about a broad range of products for the HP 3000," said users group Executive Director William Crow. "We never tried to qualify our

See RATING page 56

FIRST CONCEPT

Link ties variety of mainframe data bases to IBM Personal Computer/48

Transportable DBMS debuts for IBM, Honeywell systems/48

INSIDE

Systems Software/48

DBMS/55

Languages/56

Methodologies/56

On-line Software's Freestyle debuts

FORT LEE, N.J. — On-line Software International has announced Freestyle, a data base access system that the vendor said allows users to access selectively, manipulate and update data regardless of how that data is organized or stored.

The Freestyle system is said to be based on the company's Content Address Method technology, which allows data access by the content of a record rather than through traditional keys. The system reportedly "fits" its information into less than 25% of the original file size, offering improved disk space efficiency.

Four components of Freestyle are currently available, including the Freestyle dictionary, end-user functions that include a free-format query language, an applications program interface and the Content Address Method technology. A fifth com-

ponent scheduled for release in March 1984 reportedly will provide the ability to connect indirectly related information from multiple files.

Freestyle is said to operate by creating a content index of data and then using that index to locate data. Even data that is not structured by means of a data base management system (DBMS) can be treated as a single source of information and used accordingly, the vendor said.

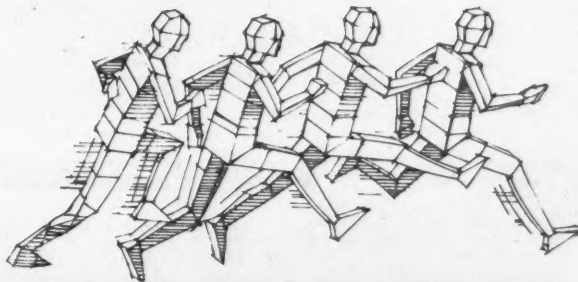
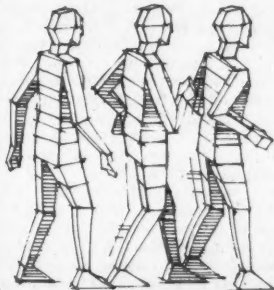
Freestyle was designed to operate on IBM processors in conjunction with IBM's Vsam, Isam and Bdam access methods. The vendor said it can also be used with most currently available DBMS. The introductory price for Freestyle is \$50,000.

On-line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

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SOFTWARE & SERVICES

Continued from page 48
change management capabilities were enhanced also.

UCC-8 Release 2.0 is priced at \$40,500.

University Computing, UCC Tower, Exchange Park, Dallas, Texas 75235.

LEVI, RAY & SHOUP, INC. Dynamic Report System

Levi, Ray & Shoup, Inc. has announced the Dynamic Report System (DRS) which, the vendor said, is a utility package to transfer IBM CICS on-line print loads to the JES II and JES III components of IBM's MVS operating system.

According to the vendor, DRS's dynamic file allocation bridge between CICS and the JES spool data sets operates on a line-by-line or on a completed report basis.

DRS is said to utilize subtasking to eliminate interference with CICS. In addition, report application programs link to the appropriate DRS interface modules and pass report parameters via a call. The calls create new reports, add print lines and terminate reports, according to the vendor.

DRS operates under all releases of MVS, JES and CICS/VS. It is priced at \$3,500.

Levi, Ray & Shoup, P.O. Box 18538, Dallas, Texas 75218.

STERLING SOFTWARE MARKETING, INC. ESP Release 2.0

Sterling Software Marketing, Inc. has enhanced its Execution Scheduling Processor (ESP), a job scheduling system for IBM 370 mainframes.

The system consists of two modules: dependent job control and job submission systems. The package features data set trigger, automatic JCL tailoring and historical tracking, according to the spokesman.

The JCL tailoring capability allows a user to include or exclude portions of a procedure, the vendor said.

The package runs under any release of IBM's MVS operating system. For one CPU, each module costs \$12,000; together, the two modules sell for \$21,600.

Sterling Software Marketing, Crocker Bank Building, 1007 Seventh St., Sacramento, Calif. 95814.

MARTIN & MARTIN TECHNICAL SERVICES Telescope

Martin & Martin Technical Services has announced Telescope, described as a tool for the IBM CICS programmer in IBM's MVS operating system environment.

Telescope is said to consist of more than 30 on-line transactions and a TSO cross-region monitor. The system features a dynamic storage map, memory display and optional memory alter, detailed terminal information and detailed Vsam file information.

Telescope is designed for MVS users of CICS Version 1.5 or 1.6. The system is priced at \$5,000 or can be leased for \$200 per month, the vendor said.

Martin & Martin Technical Services, 1626 Stafford Drive, Orlando, Fla. 32809.

SYNCSORT, INC. Synsort OS Release 2.5

Synsort, Inc. has announced Release 2.5 of Synsort OS, said to be a sort and merge program for IBM's OS operating system environment.

According to a spokesman, enhancements to Release 2.5 include data utility features that provide report writing, field manipulation and multiple output capabilities.

Synsort OS Release 2.5 can sort and manipulate data and present the output in user-specified report form. Its report writing capabilities — dubbed Sortwriter — include headers, trailers, totaling and subtotaling and page and section levels, the spokesman said.

A multiple output feature can reportedly produce any number of separate outputs from one pass of the sort and direct each output to a different device.

Used in conjunction with the sort's selection and formatting functions and Sortwriting features, this allows the simultaneous generation of a variety of reports, which are individually formatted and contain unique records, according to the vendor spokesman.

Release 2.5 of Synsort OS is licensed for three years at \$7,600, the vendor said.

Synsort, 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

PRODUCTIVITY AIDS

BSC, INC. Flexsys 4

BSC, Inc. has introduced Flexsys 4, an application generator that runs on IBM Series/1 minicomputers.

The generator features menu-driven screens, commands on each menu and screen-building capability, according to the vendor. Features include automatic changing, deleting and adding of records to a screen, sorting on any or all fields and support for subtotal, subheading, header and page-footing options.

The system consists of two modules: an application development module costs \$10,000, and a customizing feature sells for \$800.

BSC, 1505 Roswell Road, Marietta, Ga. 30062.

INTERACTICS, INC. Smash Release 5.0

Interactics, Inc. has announced an enhancement for its Special Module for Application Screen Handling (Smash), an interactive Cobol screen generator that runs on Prime Computer, Inc. minicomputers.

Release 5.0 generates an audit trail in a file maintenance program and features a recovery program that rebuilds a master file, according to the vendor. The system creates documentation for a terminal user whenever an add, change or delete module is used.

A one-time licensing fee costs \$5,000 with a 10% annual charge for maintenance.

Interactics, 7203 Marisol St., Houston, Texas 77083.

MANAGEMENT AND COMPUTER SERVICES, INC. Datamacs II

Management and Computer Services, Inc. has announced that its Datamacs automatic test data generator is now available for Honeywell, Inc.'s Geos 3 and Geos 8 operating systems.

The software, according to the vendor, will be offered both as a stand-alone package — Datamacs II — or in combination with its Tracmacs audit path analyzer system. Datamacs II is said to facilitate the creation and maintenance of test data for software testing, and it allows quality assurance techniques to be built into programs to guarantee that they meet requirements.

Datamacs II is priced at \$26,000, and Tracmacs is priced at \$20,000. Discounts are available when the systems are purchased together.

Management and Computer Services, Great Valley Corporate Center, Valley Forge, Pa. 19482.

APPLICATION PACKAGES

MCBA, INC. Release 3 accounts payable

MCBA, Inc. has announced Release 3 of its accounts payable package written in Cobol for Wang Laboratories, Inc.'s Wang VS series computers.

The enhanced package reportedly includes an interface to MCBA's Release 3 general ledger, purchase order and receiving and mailing list

packages. It features a user-defined general ledger account number format allowing up to 21 characters in up to five levels.

One-time source code licenses range from \$2,000 to \$6,000.

MCBA, 2441 Honokuli Ave., Montross, Calif. 91020.

SAGE DATA, INC. Sagegraf

Sage Data, Inc., has announced a graphics product designed to enhance the performance of Issco, Inc.'s Tell-A-Graf on IBM VM/CMS.

Sagegraf reportedly provides Tell-A-Graf users with menu-driven selection and execution of graphics, an integrated time series data base manager and error-free downloading

Continued on page 50

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SOFTWARE & SERVICES

Continued from page 49

of presentation-quality graphics plot files to the IBM Personal Computer.

Sagegraf has a one-time fee of \$8,500 per CPU. SagePC, with communications and graphics terminal emulation capabilities, costs \$250 per Personal Computer, while additional hard-copy graphics device drivers for the Personal Computer cost \$100 each.

Sage Data, 104 Carnegie

Center, Princeton, N.J. 08540.

GEOGRAPHIX, INC. Graphix-11

Geographix, Inc. has announced that its Graphix-11 business graphics software is now available for use with all operating systems for Digital Equipment Corp.'s LSI-11, PDP-11 and VAX-11 series processors.

In addition to its original

DEC RT-11 version, the vendor said, Graphix-11 can be operated with DEC's RSX-11M, RSTS/E, VMS and TSX-Plus operating systems. Graphix-11 produces line graphs, bar charts, pie charts and scatter grams using dot matrix printers.

The system either operates in an interactive question-and-answer format or is driven by a keyword file as part of a larger application, the vendor said.

The RT-11 and TSX-Plus versions of Graphix-11 are priced at \$1,095, the RSX-11M and RSTS/E versions at \$2,095 and the VMS version at \$2,959, according to the vendor.

Geographix, 156 N. Third St., Philadelphia, Pa. 19106.

COMMERCIAL SYSTEMS LABORATORIES, INC. CS Ware

Commercial Systems Lab-

oratories, Inc. has announced CS Ware, which combines the company's general business accounting applications and report and inquiry program generators.

The package includes five accounting modules: CS accounts receivable; CS accounts payable; CS general ledger; CS payroll; and CS order entry/inventory.

CS Ware can run on the entire family of Data General Corp. processors utilizing DG's Interactive Cobol (Icobol) software. CS Ware may also operate under DG's AOS and AOS/VS operating systems.

CS Ware integrates user-defined data dictionary elements and Icobol copy libraries to generate inquiry and report programs in each application module.

CS Ware costs \$10,000.

Commercial Systems Laboratories, 459 N. Dean Road, P.O. Drawer 2710, Auburn, Ala. 36830.

AMERICAN SOFTWARE, INC.

Application package
enhancements

American Software, Inc. has announced enhancements to three of its application packages for IBM 4300 series and larger mainframes under IBM's DOS/VS operating system using Vsam.

Release 11.2 of its Inventory Management System software has been enhanced to provide better planning capabilities and more precise exception messaging and reporting, the vendor said.

The package's Inventory Evaluation Subsystem has been rewritten so that summary results showing inventory investments necessary to accomplish customer service or in-stock objectives can be produced for historical comparison.

American Software also enhanced its Sales Forecasting System, adding more user controls and greater simulation capabilities.

Its Fixed Asset Accounting System has been enhanced with an on-line security feature that allows users to assign, by password, those functions and screens each user is allowed to access, according to the vendor.

The enhancements to each package are provided at no cost to current users. The Fixed Asset Accounting Sys-

Continued on page 54

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**"WITH VAX WE CAN BUILD
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—John J. Clancy, Senior Vice President, Industry and Product
Management, McDonnell Douglas Automation Company

"VAX has tremendous market pull," says John Clancy. "It's the only computer that could help a company this size achieve the ambitious growth rates we've set. Last year, our CAD/CAM operation grew 80%. We couldn't have done it without VAX computers."

MCAUTO designs applications that run on standard hardware and software systems. "VAX and the VMS operating system are ideal for an OEM with this marketing strategy," says John Clancy. "We can layer any application on VAX without fundamentally changing it. This way our customers can use the equipment later for additional applications—and increasingly they want to."

From an OEM's point of view, John Clancy believes that Digital provides essential strengths. "From market penetration to continuing customer support, the company is solid," he observes. "Their products are constantly growing and improving. They let us in on their long-range plans, and that allows us to make long-range plans."

"When we enter a market, we do so with the intention of becoming a leader," he says. "VAX is clearly the leader in 32-bit computers. That's why we buy it. That's why we're so enthusiastic about selling it. It's a pure productivity story."

What market would you like a share of? For more information on VAX systems, call 1-800-DIGITAL, extension 200. Or write: Digital Equipment Corporation, 200 Baker Avenue, Attention: Media Response Manager, CF01/M95, West Concord, MA 01742.

MCAUTO, a division of McJannet Industries and one of Digital's largest commercial OEMs, supplies applications software to health care, robotics, architecture, CAD/CAM and other industries. SYSTEM ONE, the company's newest engineering management package, is being offered exclusively on VAX computers.

digital

SOFTWARE & SERVICES

Continued from page 50
tem is priced between \$25,000 and \$50,000.

The Inventory Management System is priced between \$20,000 and \$150,000, and the Sales Forecasting System costs between \$18,000 and \$150,000, depending on the modules and features selected, according to the vendor.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

COMPREHENSIVE SOFTWARE DESIGN, INC.

Mapics enhancements for System/36, System/38 users

Comprehensive Software Design, Inc. (CSD) has announced that its IBM System/34 Manufacturing, Accounting and Production Information Control System (Mapics) enhancements are now available for users of IBM's System/36 and System/38 processors.

The enhancements include CSD's Multiple Warehouse material requirements planning (MRP) system, which allows manufacturers with multiple manufacturing facilities to process MRP for all manufacturing locations.

CSD's Vendor Release System will inform vendors when, where and what to ship in order to meet schedules based on the latest MRP requirements generation.

The vendor said prices for

the software packages range from \$800 to \$6,000.

Comprehensive Software Design, Suite 115, 22371 Swan Road, South Lyon, Mich. 48178.

AUTO-TROL TECHNOLOGY CORP.

Plan; Illustrator

Auto-Trol Technology Corp. has announced two application packages for its Advanced Graphics Worksta-

tion 32-bit computer-aided design and drafting systems for architectural design and drafting. The packages will also operate on Auto-Trol's Advanced Raster Workstation, which is designed to run on Digital Equipment Corp.'s VAX-11 series of 32-bit processors.

Plan is an architectural drafting and documentation system that will aid in creating floor plans and reflected ceiling plans, a spokesman said. It reportedly enables a designer to generate door and finish schedules automatically. It provides design symbols such as doors, windows, electrical symbols and bathroom fixtures.

Illustrator is an architectural rendering design system providing over 70 symbols, including people, automobiles and vegetation, for the designer's use in creating high-quality presentation renderings of plan and elevation views. It features figure manipulation capabilities that enable the user to create symbols.

Plan is priced at \$1,750 per copy and Illustrator at \$1,000 per copy.

Auto-Trol Technology, 12500 N. Washington St., P.O. Box 33815, Denver, Colo. 80233.

CREATIVE COMPUTER RESOURCES, INC.

Utility billing system

Creative Computer Resources, Inc. (CCR) recently announced a billing and file maintenance package designed for water districts utilizing the IBM System/36.

The company sells the system in a standard package that is then customized by CCR to meet the needs of individual clients, a spokesman said.

The package reportedly tracks customers' daily water consumption, generates monthly utility bills, produces individual billing forecasts and maintains records on each account in the system.

The base price of the package is \$40,000.

CCR, Suite B-103, 151 Kal-mus, Costa Mesa, Calif. 92626.

KENCOR CORP.

Patient Accounting System Software

Kencor Corp. has introduced Patient Accounting System Software (Pass), a medical accounting and statistical system designed for the Wang Laboratories, Inc. VS computer.

The Pass package consists of patient scheduling, patient billing and accounts receivable modules. The package maintains patient diagnoses, medical procedures and administrative information, according to the vendor. Reportedly, the package

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SOFTWARE & SERVICES

produces Medicare, Medicaid and private patient bills and statistical reports, including the Bureau of Community Health Services Common Reporting Requirements.

Pass costs between \$25,000 and \$50,000 for a one-time licensing fee. Yearly maintenance costs vary from \$200/mo to \$500/mo.

Kencor, 3647 All-American Blvd., Orlando, Fla. 32810.

CONTINENTAL HEALTHCARE SYSTEMS, INC. DRG Module

Continental Healthcare Systems, Inc. has announced a modular software add-on package designed to provide automated medication recordkeeping for its Pharmakon minicomputer systems.

The Diagnostic Related Group (DRG) Module is said to integrate clinical and financial data to provide medication reports and other pharmacy management reports relating to diagnostic related groups, the disease categories carrying fixed Medicare and Medicaid fees.

The module reportedly uses DRG numbers to maintain pharmacy records by patient name, medication, physician, discharge and type of case. It is available for Pharmakon Systems 200, 400 and 1000 at a price of \$5,000.

Continental Healthcare Systems, 8900 Indian Creek Pkwy., Overland Park, Kan. 66210.

HARPER AND SHUMAN, INC. CFMS

Harper and Shuman, Inc. announced Computer-Based Financial Management System (CFMS), an interactive architecture and engineering system that runs on Prime Computer, Inc. Series 50 minicomputers.

The system features project control, accounting, financial reporting, billing, payable and multidivisional systems integrated into one application. The software requires 1M byte of main memory and 20M bytes of auxiliary storage. The system features interactive data entry, editing and reporting capabilities.

Prices for a one-time licensing fee range from \$14,000 to \$25,000.

Harper and Shuman, 68 Moulton St., Cambridge, Mass. 02138.

DATA BASE MANAGEMENT SYSTEMS

UNITED INFORMATION SERVICES, INC.

Catalogue

United Information Services, Inc. (UIS) has announced an enhanced data dictionary for the Digital Equipment Corp. VAX-11 version of its Seed data base management system (DBMS).

Called Catalogue, the dictionary is part of Seed's application development system and is said to offer users of the DBMS reporting capabilities for improved communication, analysis and control. Catalogue allows data to be tracked during the continuing development of a data base.

The Seed DBMS includes the application development system, decision support option and the Catalogue data dictionary. The VAX-11/730

version of Seed is priced at \$24,500, the VAX-11/750 version at \$35,000 and the VAX-11/780 version at \$49,500.

UIS, P.O. Box 8551, Kansas City, Mo. 64114.

SYSTEM SUPPORT SOFTWARE, INC. Quikwrite enhancements

System Support Software, Inc. has announced enhancements for its Quikwrite, an end-user report writing system.

The release is designed to provide increased functionality and greater ease of use by nonprogrammers.

The release reportedly features native support for IBM Vsam files, automatic access to table functions, additional built-in exit points for in-

serting user-written subroutines, a free-form dictionary maintenance program and new verbs, including attach, average and onbreak.

Quikwrite is designed to run on IBM mainframes, including the IBM 360, 370 and 4300 series, and is available now.

Quikwrite is priced at \$8,500 for IBM DOS and \$9,500 for IBM OS.

System Support Software, 5230 Springboro Pike, Dayton, Ohio 45439.

NATIONAL COMPUTING INDUSTRIES, INC. Tums Release 5.0

National Computing Industries, Inc. has announced Release 5.0 of its Total Utility Maintenance System (Tums), which supports Cincom Sys-

tems, Inc.'s Total data base management system (DBMS).

The vendor said Tums is a utility maintenance system developed to support the Total DBMS when used in conjunction with IBM mainframes.

The new release supports Total Series 80 and TIS and IBM disk devices, including the 3375 and 3380 disk drives.

Vsam support has been added for count-key data and fixed-block architecture devices in addition to features designed to increase loading and unloading performance.

Tums is priced at \$3,950 for IBM's DOS/VSE operating system and \$4,450 for the IBM OS/MVS operating system.

National Computing Industries, 6075 Roswell Road, Atlanta, Ga. 30328.

NATIONAL DATABASE AND 4TH GENERATION LANGUAGE SYMPOSIA

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Larry Ellison, Pres. Oracle Corp.
Orland Larson, Database Specialist Hewlett-Packard
John Maguire, Pres. Software AG of N.A.
Thomas Nies, Pres. Cincom Systems
Mike Potter, Chairman Cognos Corp.
Dr. George Schussel, Pres. Digital Consulting Assoc.
Greg Scott, Pres. MAG Software, Inc.
Kenneth Sloan, Product Manager ADR
Dr. Michael Stonebreaker, VP Relational Technology, Inc.

The first day of the National Database and 4th Generation Language (DB + 4GL) Symposium will feature an accelerated class covering the important concepts of data management technology that will be required in the 1980's. Data Base Management Systems (DBMS), Teleprocessing Monitors, Query Packages, Reporting Systems, Data Dictionaries, Micro/Mainframe links and 4th Generation Languages will be highlighted as the key tools necessary to develop modern software. The first day will be taught by Dr. George Schussel.

Days 2-4 of the DB + 4GL Symposium will feature technical presentations by the top software product vendors in data management including:

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SOFTWARE & SERVICES

LANGUAGES

INTERNATIONAL ELECTRONIC MACHINERY, INC.
Fortran-77 compiler

International Electronic Machinery, Inc. has announced a Fortran-77 compiler for Hewlett-Packard Co. series 200 desktop computers.

The compiler is compatible with Ansi-Fortran 77 compilers used on mainframe computers.

The compiler reportedly allows programmers to effectively use the graphic and I/O capabilities of Series 200 microcomputers.

It costs \$1,200, the vendor said.

International Electronics Machinery, P.O. Box 1818, Fort Collins, Colo. 80522.

LOGITECH, INC.
Modula-2

Logitech, Inc. has announced a Modula-2 compiler for the Digital Equipment Corp. VAX-11 family of supermini computers under DEC's VMS operating system.

Modula-2 is a general purpose programming language with systems programming capabilities. The compiler, which was developed at the University of Hamburg, West Germany, is said to generate VAX native object code, while separately compiled Modula-2 modules are linked with the VAX/VMS linker. According to the company, the VAX/VMS Symbolic Debugger can be used to debug Modula-2 programs.

Features specific to the VAX/VMS environment are said to include four floating data types, including Byte (8-bit), Shortword (16-bit), Quad-

word (64-bit) and Octaword (128-bit).

The price for a single computer license is \$1,500 per year with 90 days of maintenance. Additional maintenance is available for \$300 per year.

Logitech, 165 University Ave., Palo Alto, Calif. 94301.

METHODOLOGIES

CARA CORP.
Cara Systems Development Standards enhancements

Cara Corp. has announced a price increase and enhancements to its Cara Systems Development Standards. The customized software and service package, customized for each client, is designed to assist organizations in systems development, according to a spokesman for the vendor.

Enhancements are said to include Cara's Epsilon automated estimating support tool, a software package designed to run on IBM mainframes under TSO; Wang Laboratories, Inc. 2200 VS80 minicomputers; and IBM Personal Computers.

Additional enhancements are said to include Cara's training program and training manual, "Heuristic/Prototyping Considerations," which deals with problem-solving by experimentation; a professional systems analyst development seminar tailored to each organization; Cara's "Software Selection Guidelines and Techniques" publication.

The price increase from \$31,500 to \$41,500 goes into effect March 15.

Cara, Suite 110, 611 East Butterfield Road, Lombard, Ill. 60148.

RATING from page 47

respondents and never guaranteed that all the people who completed our survey form would be bona fide users."

But although he rejects Simmons' claim that the survey presents Protos' product in a misleading light, Crow did recently offer the company an opportunity to air publicly its gripes through *Interact's* letters-to-the-editor column. In response to the software vendor's persistent criticisms, he also recently issued a brief disclaimer advising users group members to take the survey findings with a proverbial grain of salt.

For Protos, both of Crow's attempted remedies fall woefully short of their intended mark. A general disclaimer, Simmons said, would be insufficient to counteract a misconception about a particular company's product, and a Protos-written letter of complaint would carry far less weight than a formal retraction from the group itself. In a letter sent last month to the users group's headquarters, Protos "indicated its willingness to initiate legal action if we don't do as they ask," Crow said.

The object of the six-year-old vendor's simmering discontent is the latest edition of the users group's annu-

al membership survey, which solicits performance evaluations about the HP 3000 itself and its full range of hardware and software accessories.

Jointly funded by HP and the users group, the survey's most recent installment was mailed early last year to nearly 4,200 members, who were asked to rate their products' operation on a scale of zero to four. As defined by the survey's creators, zero represents the lowest degree of user satisfaction and four the highest. Recipients were asked to evaluate Protos' product and four competitors.

Of the almost 1,800 members who returned questionnaires, 66 gave an opinion on the Protos language, which earned an average rating of 2.67. A top rating of 4.0 indicates a "very satisfied" user, while scores of 3.0 and 2.0 correspond to "satisfied" and "neutral," respectively.

Disappointed by its product's less-than-glowing performance grades, Protos supplied Crow with a copy of its certified customer list and asked him to check its contents against the names of the 66 survey respondents. Only 33 of the names were found to appear in both sets of data, but as a whole, the subgroup of bona fide users evaluated Protos at 3.06, considerably higher than the product's official, published rating.

CINCOM from page 47

leasing the DBMS module separately, the company hopes to provide a method for users to migrate to TIS's data base structure and then add the application development facilities when it is ready to make the financial and organizational commitment.

Also look for activity in the area of network management. Cincom has long espoused the distributed data base concept and offers a vehicle to run applications written for the Digital Equipment Corp. VAX-11 superminis on IBM mainframes. The company's strength in providing systems software for a broad range of processors makes it a natural to provide some path for piecing them all together. In combination with TIS, a network management facility would be a major step in preparation for a full distributed processing system.

Notably absent from Cincom's Jan. 18 announcement of an IBM Personal Computer-CPU link was an agree-

ment with a microcomputer vendor. Most sellers, of course, have chosen to link up with Visicorp or Lotus Development Corp. to develop routines to optimize downloading into those vendors' popular Personal Computer-based packages. Cincom has an agreement up its sleeve as well, but it won't be with Lotus or Visicorp. Officials aren't saying just who will be the lucky recipient yet, but expect an announcement soon.

Cincom may cap off all this activity later in the year with a public stock offering. With expected 1983 revenues of more than \$70 million, it would be one of the largest software firms ever to do so. Cincom President Tom Nies has been a vigorous opponent of public offerings until this point, saying that stock market pressure typically prevents firms from investing heavily in any R&D that doesn't boost the bottom line. However, in a recent interview Nies indicated he has softened a good deal on the stock offering question.

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COMMUNICATIONS

Fiber net ties 27 Miami buildings

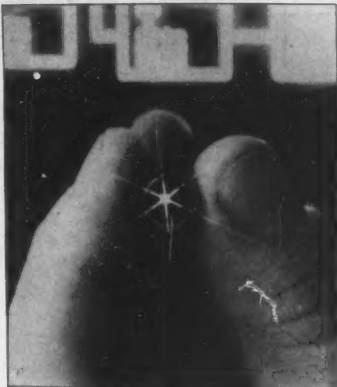
MIAMI — To meet this city's growing demand for communications — both voice and data — occupants of 27 buildings in the financial district talk via pulses of light over hair-thin glass fibers.

When the digital lightwave network is completed in 1985, a total of 30 buildings in the Ball Point-Brickell Ave. district of the city, which includes brokerage houses, banks and high-rise condominiums, will be a part of the most extensive lightwave installation of its kind in the world. The system will be able to handle 672 simultaneous telephone calls or equivalent amounts of data or television over each pair of fibers.

The lightwave system servicing Miami's "Wall Street" is known as a Fiber SLC (subscriber line carrier) system. It is a rugged system, specifically designed for the telephone loop — the facilities that connect a customer with a local switching office.

Bell Laboratories worked with Southern Bell Telephone Co. to tailor the lightwave network for Miami, and AT&T Western Electric Co. manufactured the system for installation by Southern Bell.

"It's the right kind of system for this particular situation," said Larry Mixon, spokesman for Southern Bell. "The fiber-optic system has better applications for technology and for a financial district that transmits large quantities of data. It will



Financial fiber

afford us greater capacity to handle the kinds of things these types of customers will want — like quantity and speed."

Hub of net

The hub of the communications network is a Southern Bell switching center, which sends out three half-inch cables, each containing 144 glass fibers. One goes to the Ball Point area and two to the Brickell Ave. area, where they fan out in indi-

vidual fiber pairs to the buildings.

Lightwave systems solve one of the thornier problems faced by this and other U.S. cities, which is a growing shortage of underground space for cables and electronic equipment. Fibers take up little space in ducts, and electronic and optical equipment isn't required for signal boosting within local transmission systems.

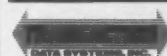
"If we hadn't gone to half-inch fiber cables for this project, we'd have had to install 20 copper cables, each of them the diameter of a fist, just to meet today's demands," said Al Naranjo, engineering manager at Southern Bell. "And to keep pace with the growth we expect, we'd have had to install two more cables each year for the next three years. Then we'd have had to dig up the streets to make room for more cable in ducts and manholes."

Naranjo expects the network's capacity will be sufficient for many years. Each pair of fibers now carries 96 simultaneous voice calls, or a combination of voice, data and private-line services. (One fiber carries incoming calls and the other outgoing calls.) Next year, Southern Bell plans to increase sevenfold the amount of calls each pair can handle by expanding the terminal equipment.

"The system is ideal for this area because of its ruggedness," said Greg Greco. See **FIBER** page 58

Telecom Canada

New option makes international packet-switched net more accessible/58



Network system products designed for Perkin-Elmer Corp. superminis/59

INSIDE

Communications Controllers/50
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Auxiliary Equipment/50

PBX integration urged by voice-mail users

Private branch exchange (PBX) integration is the feature most desired by voice-mail system owners, according to a report recently released here.

The report, titled "The Voice Mail Industry: A Strategic Analysis," published by Venture Development Corp., stated that 33% of current voice-mail system users claimed that PBX integration, which provides functions like automatic telephone answering and message-waiting notification, tops the list of desirable voice-mail system items.

These systems provide computer-controlled deposit, storage and delivery of

voice messages, allowing nonsimultaneous, verbal communications between two parties located anywhere in the world.

Without PBX integration, a voice-mail system must be reached through a separate telephone number by the caller and be periodically queried for messages by its subscriber. These inconveniences can be eliminated by making voice mail a standard PBX function, the report stated.

Additional voice-mail features desired by system owners include message desk, message-waiting indicator, address verification, subscriber directory, message delivery verification, intersystem network-

ing, user-configurable management reporting and programmable message delivery time.

The voice-mail industry, which garnered \$35.2 million in combined 1983 hardware and services revenues, will experience a compounded annual growth rate of 185% through 1987, when industry revenues will total \$2.3 billion. Of these revenues, \$1.9 billion will come from voice-mail hardware which is integrated into PBX systems. The study is available for \$3,290 from the publisher.

Venture Development is at One Washington St., Wellesley, Mass. 02181.

System installed to curb illegal textile shipments from Taiwan

EL SEGUNDO, Calif. — A communications system that is designed to curb illegal textile shipments from Taiwan to the U.S. and improve the tracking of textile imports against U.S. quotas recently became operational here.

The system was developed for the Taiwan Textile Federation (TTF) by Computer Sciences Corp., located here, and its Taiwan representative, China Data Processing Center.

According to Jim Furlong, a spokesman for Computer Sciences Corp., the system, which began functioning Jan. 1, is part of the company's network data communications service called Infonet, a worldwide data network which offers remote computing services. The data center utilizes an IBM 3083 and Sperry Corp. computer equipment.

"The way the system works is that the trade association of Taipei [Republic of China], through a computer on their end of the line, sends the information concerning authorized textile shipments via communications satellites in our network to our Infonet data center in the Washington area. We store it for the convenience of the U.S. Customs Service who then reaches over via the network and takes it into their computer," Furlong said.

As shipments arrive at U.S. seaports or airports, customs officers using remote Raytheon Co. terminals linked to the agency's IBM 3083 computer are able to verify the description, value and quantity of the goods with the information stored in the computer.

The system allows the trade asso-

ciation to inform the U.S. Customs Service of exactly what textile products have been cleared for shipment to this country for inclusion under the quota assigned to Taiwan by the U.S. government. Only those shipments recorded in Customs Service computers will be allowed entrance when goods arrive at the U.S. entry points.

In April and May 1983, customs reportedly seized \$1.2 million worth of illegal shipments, Furlong said.

Taiwan's textile trade with the U.S. runs about \$1.5 billion a year, with the TTF administering the quota on behalf of local manufacturers. Some textile traders have been known to forge TTF documents to enable their goods to gain entry to the U.S., thereby excluding legitimate shipments that arrive later and are

barred from entry because the quota has already been filled.

According to James Mahan, a spokesman for the Customs Service, the Taiwanese government picks up a summary of all the visas they issue each week and to whom they were issued. "This information comes into customs' computers in the U.S. from all of its ports of entry once a week," Mahan said. "What we do is match their listing against the visa that is accompanying the merchandise to find out whether it's a false visa or not. And this is the way that we seize illegal merchandise."

The system is working very well so far, Mahan said. Future plans call for implementing satellite communications for the system to provide timely information on a daily basis, he noted.

COMMUNICATIONS

Ansi, CSA publish first joint standard To aid videotex/teletext growth

The American National Standards Institute (Ansi) and the Canadian Standards Association (CSA) have published a North American standard to help accelerate the commercial development of videotex/teletext services in the U.S. and Canada.

The standard provides manufacturers and those involved in supplying and transmitting text and graphics for electronic banking, shopping, news, entertainment, interoffice and other communications with an agreed-upon information interchange format for developing their products and services.

The standard sets formats, rules and procedures for encoding alphanumeric text, redefinable characters and pictorial information in many colors.

It accommodates 7-bit and 8-bit bytes, depending on implementation needs.

Videotex/teletext services are available commercially on other continents, mainly Europe, but they are available only on a limited basis in the U.S. and Canada.

The groups that developed Ansi X3.110-1983 and CSA T500-1983 point out that without a standard,

hardware and software manufacturers, information providers, publishers and transaction services such as banks and retailers, have been reluctant to make the investments necessary for wide use of videotex/teletext in North America.

The Ansi X3.110/CSA T500 standard is titled Videotex/Teletext PLPS and is the first joint U.S. and Canadian standard in the information processing field.

Copies of the standard are available for \$20 each.

Ansi, 1430 Broadway, New York, N.Y. 10018.

FIBER from page 57

of Bell Laboratories. "It operates flawlessly without air conditioning in the hot, damp basements of the Ball Point-Brickell Ave.-area buildings."

The Ball Point-Brickell Ave. project is one of 20 lightwave systems under construction by Southern Bell this year. But the popularity of loop lightwave systems is growing rapidly among all the former Bell operating companies.

"In 1984, about 30% of all new loop systems installed by telephone companies are expected to be lightwave," said Bob Parthum of AT&T Western Electric. "Within the next few years, lightwave should account for more than half of all new systems."

GREAT MOMENTS IN DUMP HISTORY



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COMPUWARE
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Rate to change to 45M bit/sec

MIAMI — The Fiber SLC system project nearing completion in the Ball Point-Brickell Ave. district of the city transmits information digitally, as pulses of infrared light, at the rate of 6.3M bit/sec — equivalent to 96 conversations per pair of fibers.

Next year, according to a spokesman from AT&T Western Electric Co., that rate will be increased to 45M bit/sec, by changing components in the terminals at either end of the system.

The 45M bit/sec rate is equivalent to 672 conversations per pair of fibers. Potential applications at this rate include wideband data channels of 1.5M bit/sec directly to a customer, or 45M bit/sec compressed for video for high-quality video teleconferencing.

Datapac adds three countries

OTTAWA — Telecom Canada has added three countries to its Datapac International service and announced an option called a network-user identifier (NUI), which makes the international service more accessible.

The new additions to the service, which is provided in conjunction with Teleglobe Canada, are in Denmark, Greece and Norway. With the expansion, Telecom Canada's nationwide, packet-switched Datapac network provides access to similar networks in 37 countries.

The NUI option makes possible overseas connections for customers using Datapac 3101, which allows Ascii and teletypewriter terminals to communicate through Datapac. The NUI option allows these customers to place third-party calls from public dial ports to foreign packet-switched networks.

The NUI can also be used to place domestic calls and calls to U.S. networks from public-dial ports.

The monthly rate for NUI is \$27.80 (Canadian) each, plus \$2.20 (Canadian) for each additional NUI. A one-time installation fee, per request, is \$55.65 (Canadian).

COMMUNICATIONS

COMMUNICATIONS CONTROLLERS

MATROX ELECTRONIC SYSTEMS LTD.
Com-1

Matrox Electronic Systems Ltd. has announced the Com-1, a single-board I/O communications controller, which is plug-compatible with the IEE-P796 (Multibus).

The controller has an on-board bidirectional, 16-bit parallel port that provides interface to Digital Equip-

ment Corp.'s DR-11W or equivalent interface card. The port allows direct communications between the Multibus-based system and DEC's VAX supermini, PDP-11 or LSI-II minicomputer at rates up to 400K word/sec. The price is \$2,495.

Matrox Electronic Systems, 5800 Andover Ave., Montreal, Quebec, Canada H4T 1H4.

KMW SYSTEMS CORP.
VP-10 Vector Processor

KMW Systems Corp. has

announced the VP-10 Vector Processor, a controller that allows the connection of raster output devices to a mainframe computer.

The product accepts random vectors, symbols and other graphics information from a host mainframe, translates the data at computer speed and drives the various output devices at rated speed, the vendor said.

The VP-10 has a vector capacity of 200,000. Other features include a 128K-bit semiconductor-based memory, color support for both intensity modulated and dithered devices, diagnostics and integrated communications. Prices range from \$5,000 to \$10,000.

KMW Systems, 8307 Highway 71 W., Austin, Texas 78735.

COMPUTRONICS, INC.
Network version

Computronics, Inc. has introduced a version of its Network that adds support for additional automatic dialing modems.

According to the vendor, a Prime Computer, Inc. computer user can communicate with another computer using one of its existing asynchronous multiline controllers. Any system communicating

asynchronously in Ascii can be accommodated. Network can be used to communicate with systems from Prime, IBM, Digital Equipment Corp., Hewlett-Packard Co., Data General Corp. and Sperry Corp.

According to the vendor, neither special software on the remote system nor a device to support communications is necessary. The price is \$1,200.

Computronics, 130 N. Ash, Wood Dale, Ill. 60191.

VOICE/DATA COMMUNICATIONS

FUJITSU SYSTEMS OF AMERICA
PSC/I

Fujitsu Systems of America has introduced the Point-of-Sale Communications System/I (PSC/I) for the IBM Series/1.

The product provides an interface between store-level point-of-sale (POS) systems and central data processing sites. PSC/I supports the company's 7880 and 7990 POS terminals, its 7110 Terminal Support Processor and the TRW 2001 POS terminal. It was designed to operate exclusively on the IBM Se-

ries/1, the vendor said.

The system offers execution of data collection and re-formatting, file upload/download, message distribution, POS terminal parameter maintenance/downloading and reporting, a company spokesman said. PSC/I costs \$35,000 and will be available in July.

Fujitsu Systems of America, 9841 Airport Blvd., Los Angeles, Calif. 90045.

REMINGTON RAND CORP.

Serif workstation enhancements

Remington Rand Corp. has announced added data communications capabilities to its Serif workstation.

The communications features provide automatic dialing and answering and memory password recall. Other product features include access to telex networks for domestic and international communications; access to information services, airline information and other business data; and on-line connect to Westlaw for legal case data bases, the vendor said. The price is \$600. Optional software costs \$450.

Remington Rand, 9950 W. 74th St., Minneapolis, Minn. 55344.

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Transaction Data unveils product line

Transaction Data Systems, Inc. has announced the Freedom Network System, a family of data communications products that range from single software packages to complete custom-designed, turnkey data networks.

The system software was designed to operate on Perkin-Elmer Corp.'s supermini-computer systems. These packages include Packet Network Facility for building private packet switching networks; Network File Service Facility and File Transfer Facility for network operating system services; and Micom Multiplexer Emulation Facility, according to a spokesman for the vendor.

The network system supports all IBM protocols, including Systems Network Architecture/Synchronous Data Link Control as well as Sperry Corp., NCR Corp., Control Data Corp., Burroughs Corp. and X.25 protocols.

Individual software modules range from \$2,500 to \$5,000. Complete network systems range from \$80,000 to \$3 million.

Transaction Data Systems, 5750 Major Blvd., Orlando, Fla. 32805.

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COMMUNICATIONS

COMMUNICATIONS
SOFTWARECONTEL INFORMATION
SYSTEMS, INC.
Mind/Voice

Contel Information Systems, Inc. has introduced Mind/Voice, an interactive software-based system for the analysis of telephone traffic originating at a single location.

The product is used to design optimal mixes of Wats facilities. The system considers the use of the tie lines — private branch exchange (PBX) to PBX — and Foreign Exchange lines — PBX-to-distant-city telephone company exchanges. It will also consider the tariffs of specialized common carriers, as well as AT&T's current and proposed tariffs, the vendor said.

The traffic analysis subsystem reads call-record data, organizes the information into an accessible data base and produces analytic and management reports, which give the user a profile of the existing traffic and how it is handled, according to the vendor. The license costs \$3,500/year.

Contel Information Systems, 130 Steamboat Road, Great Neck, N.Y. 11024.

APPLIED VOICE TECHNOLOGY
Phonexpress; Phoneforms; Voicepak

Applied Voice Technology (AVT) has introduced three software board products that allow users to create voice-messaging and response systems on S-100 bus-based computer systems.

According to the vendor, the three voice-processing packages — Phonexpress, Phoneforms and Voicepak — can be used with proprietary software and run under Digital Research, Inc.'s CP/M 86 and MP/M 86 operating systems.

Phonexpress is a voice-mail package that digitally records, stores and plays back voice messages for up to 300 users using one to four telephone

lines. It includes all software and documentation, a voice I/O processor and from one to four telephone-line cards. Costs for a single-line package are \$4,500, with an additional \$1,000 for each additional line card.

Phoneforms is a voice-oriented data collection and retrieval utility that allows users to create custom-voice questionnaires at the telephone.

It can be combined with Phonexpress to form a voice-messaging environment to support data collection. It is priced at \$3,000.

Voicepak is a package of Pascal subroutines that handles telephone activity, processes Touch-Tone data and records and plays back speech, the vendor said.

The programs cost \$750 as add-ons to the Phonexpress package or may be purchased for \$2,500 as a package, which includes the necessary I/O processor and/or a telephone-line card.

Applied Voice Technology, Suite 5A, 2103 Harrison Ave., Olympia, Wash. 98502.

MULTIPLEXERS/
MODEMSPRENTICE CORP.
Auto-dialing modem

Prentice Corp. has introduced a 1,200 bit/sec autodialing modem that utilizes two custom Cmos integrated circuits to achieve full-duplex, Bell 212A-compatible operation, tone sensing, voice/data control and RS-232C operations.

Features include full call-progress tone sensing of dial tone, busy tone, remote ring and voice, according to a spokesman for the vendor.

There is also a function that eliminates the need for option switches or special EIZ RS-232 cables, the spokesman said. The price for the modem is \$475.

Prentice Corp., 266 Caspian Drive, P.O. Box 3544, Sunnyvale, Calif. 94088.

ANCHOR AUTOMATION, INC.
Signalman Mark XII

Anchor Automation, Inc. has introduced the Signalman Mark XII, an autodial, autoanswer modem.

Some of the product's features include manual operation through a keyboard without computer coding, or automatic operation to answer and originate calls at 1,200 bit/sec for Bell 212A compatibility and up to 300 bit/sec for Bell 103. The product also detects dial-tone and busy signals, automatically displaying dialing status on the CRT, the vendor said.

The Mark XII uses a standard RS-232 serial interface with a built-in cable, comes equipped with two telephone jacks and cord and is directly connected to a wall-telephone outlet, according to the vendor. The price is \$399.

Anchor Automation, 6913 Valjean Ave., Van Nuys, Calif. 91406.

TEST EQUIPMENT

TELPAR, INC.
DCT-100 Datacomm Tester

Telpar, Inc. has announced the DCT-100 Datacomm Tester, an enhancement to the standard RS-232C "breakout box" marketed by the company.

The tester provides the industry-standard breakout panel with the additional ability to print out the received or transmitted data stream on

a 20-col. thermal-printer integral with the tester.

The tester also provides verification of transmitted data and commands and time to analyze and study the data and commands. The price is \$895.

Telpar, 4137 Billy Mitchell Road, Addison, Texas 75001.

AUXILIARY
EQUIPMENTPERIPHERAL TECHNOLOGY,
INC.
Scat Network Controller

Peripheral Technology, Inc., a manufacturer of IBM 3270 terminal controllers, has introduced the Scat Network Controller (SNC), an expansion feature for Scat 2 protocol converters.

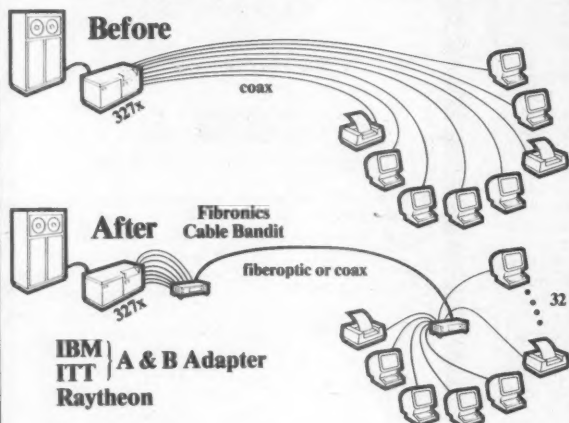
According to the vendor, the product allows up to 25 Asci RS-232 communications ports under a single control-unit address. The vendor's standard protocol converters provide from three to five IBM 3270 ports per unit.

SNC may be distributed up to 4,000 feet using RS-422. The product allows distribution throughout buildings or across campuses without the expense of coaxial cabling, the vendor said.

The price for the three-port SNC is \$795; the five-port SNC is \$995, according to the vendor.

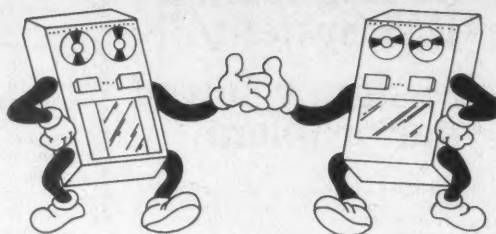
Peripheral Technology, 14784 N.E. 95th, Redmond, Wash. 98052.

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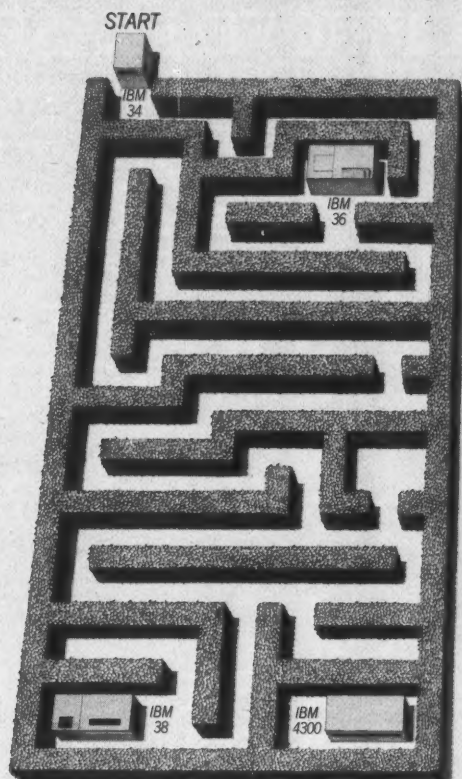
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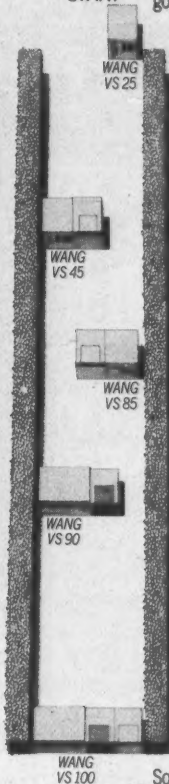
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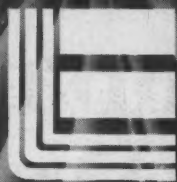
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SYSTEMS & PERIPHERALS

What solid-state means for you

SHOP TALK

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During this last year, the semiconductor industry has been promoting the new developments in solid-state memory. But what does it mean to your computer equipment or data processing capabilities?

For example, this year a half-dozen semiconductor companies announced the availability of the first samples of a 256K-bit dynamic random-access memory (RAM).

As shown in Table 1 (see page 68), these new developments have been occurring approximately every three years since 1970, and the next improvement is expected in 1986.

This increase in memory means (again referring to Table 1) the cost per bit of memory has been decreasing over 30% per year for the last 14 years. This cost improvement curve, which is expected to continue, translates into a similar cost/performance improvement for the computer hardware.

Operating speed improved

In addition to less expensive hardware, improvements in solid-state memory also improve the operating speed of processors. As a rule, the larger the number of bits that are packed onto a chip, the denser the circuits must be to access the memory.

This has a direct impact on the internal performance of computer systems, often rated in terms of millions of instructions per second. The use of higher capacity chips, particularly in large computer systems, offers several advantages.

In large systems, for example, the majority of memory takes the form of hard magnetic disks. This is still the lowest cost approach (see Figure 1 on page 68); however, the access time is much slower than with semiconductor memory.

As semiconductor costs continue to decrease, more of the computer's active

See **MEMORY** page 68

Study predicts microminis may finish off 16-bit minis

By Patricia Keefe
CW Staff

CUPERTINO, Calif. — The demise of the 16-bit minicomputer is a trend industry watchers have been predicting for some time. In response to sagging sales related to higher performance superminicomputers and less expensive microcomputers, makers of traditional 16-bit minicomputers have been struggling to find niche markets for their products. But now the end may truly be near.

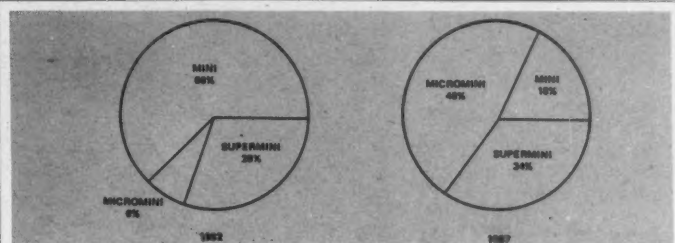
According to a recent study, a new class of processor, the microminicomputer — sometimes called the supermicrocomputer — may pound the final nail into the 16-bit minicomputer maker's coffin. Microminis appear to do everything the older 16-bit

machines could do, but are more reliable, less expensive and take up less space.

Now what happens to all the 16-bit minis? Users may find themselves holding what amounts to outdated hardware. In addition, if the proliferation of microminicomputers continues, control of corporate computing may slip through the hands of the DP department and into the laps of end users, according to consultant Andrew Allison, who prepared the report, "Managing the Microminicomputer Explosion: A Guide for Manufacturers, Users and Third Party Participants" for Electronic Trend Publications here.

Microminicomputers are one of the most significant outcomes of the confluence of a

See **MINIS** page 68



Market share by type of computer, 1982-1987

Chart: Electronic Trend Publications

Mirage available for DG Eclipse MV

WESTBORO, Mass. — Data General Corp. has announced that Rational Data Systems, Inc.'s Mirage system is available on DG's Eclipse MV series processors. The Mirage system, which consists of the Mirage M102 processor, lets Eclipse MV users run microcomputer software based on Digital Research, Inc.'s CP/M 80 operating system on DG's 16- and 32-bit computers.

The Mirage M102 processor reportedly can occupy any I/O slot in a standard chassis and allows Eclipse users to run programs written for the CP/M operating sys-

tem. The M102 contains two Zilog, Inc. Z80A-based micros, each with 64K-bytes of random-access memory and asynchronous communications ports. The system also contains CP/M, a variety of utilities and the Mirage "server."

The Mirage system is available as a package with hardware and software for two users for \$3,295. Rational Data Systems also offers the Mirage F100 Floppy Disk Subsystem as an option for \$1,495.

DG, 4400 Computer Drive, Westboro, Mass. 01581.

Xerox announces 2700 II printer with SNA interface capability

EL SEGUNDO, Calif. — An enhanced model of the Xerox 2700 distributed electronic printer that can interface with IBM's Systems Network Architecture (SNA) was announced recently by Xerox Corp.

Called the Xerox 2700 II, the unit reportedly can be used for printing in an SNA environment.

Also announced were two software packages for the 2700 II, which are said to enhance the printer's capabilities for creating documents. The programs are called Remote Print Management Facility (RPMF) and Document Composition Facility-Xerox Postprocessor (DCF-XP).

Like the 2700, the 2700 II will continue to be used for remote or distributed printing or for printing di-

rectly from small business computers and minicomputers. It can store 256K bytes of memory, compared with 64K bytes on the 2700. The font capability per page was also enhanced, allowing up to 16 different fonts to be used on each printing job. Eleven foreign languages were also added to the printer, the vendor said.

The 2700 communicates in a binary synchronous mode over IBM 2770, 2780 and 3780 protocols. The 2700 II can operate as a distributed printer in IBM 3274/3276 (using the Xerox 274 interface) and 3770 networks (via the Xerox 271 communications module) using SNA Synchronous Data Link Control.

The 274 enables interactive printing in the 3274/3276 environments,

while the 271 allows the 2700 II to handle batch printing jobs in IBM 3770 environments, the vendor said.

The RPMF package reportedly helps to manage the creation, storage and printing of forms and charts on the 2700 II. It is the 2700 II version of the Xerox Host Forms Description Language, used on Xerox 9700 and 8700 printers and allows most charts and forms designed for those printers to be recompiled for printing on the 2700 II, the vendor said.

The second software package, DCF-XP, is said to interface the 2700 II to the IBM Document Composition Facility, a page composition software package.

Current 2700 printer customers

can have their machines upgraded on-site to the 2700 II. There is a \$1,000 upgrade charge for purchased units.

Single-unit purchase price for the 2700 II is \$19,995. On a two-year lease, with a monthly printing volume of 5,000 pages, the price for a 2700 II is \$600/mo. Also, both software packages — RPMF (\$3,870 for a single-user, one-time license fee) and DCF-XP (\$6,000 for a single-user, one-time license fee) — and the 271 communications module (\$2,750 purchase price) will be available in the second quarter of 1984. The 274 interface (\$2,375 purchase price) controller will be available in the third quarter of 1984, Xerox said.

Xerox, 880 Apollo St., El Segundo, Calif. 90245.

amdaahl

Amdahl Corp. recently announced 15% lease-price increases on its 6000 series of direct access storage devices. The increases go into effect April 23, a spokeswoman said.

INSIDE

Turnkey Systems/66

Printers/Plotters/66

Graphics Systems/70

Power Supplies/70

Board-Level

Devices/70

Auxiliary

Equipment/72

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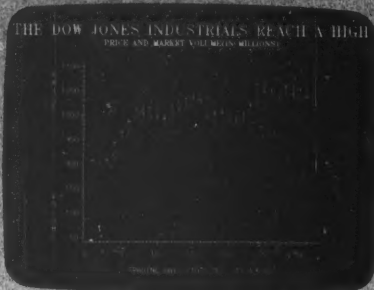


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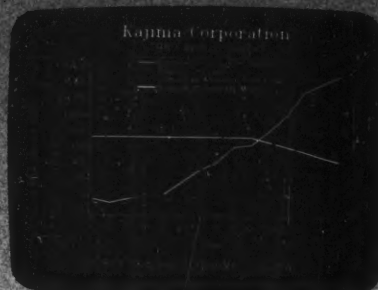
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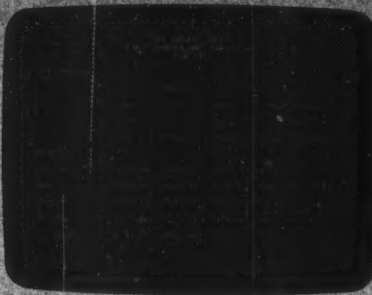
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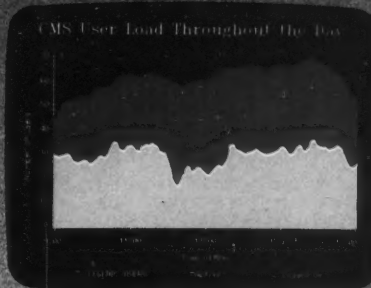
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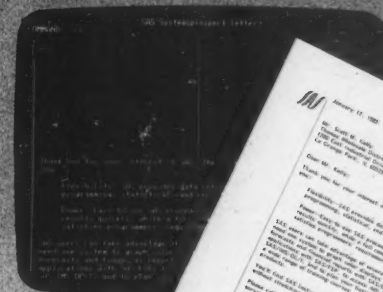
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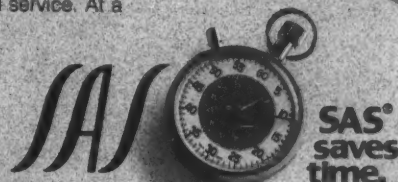
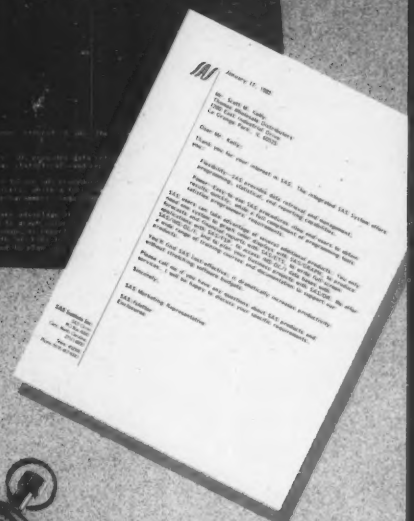
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Screenstor

Climax Computer Corp. recently announced a peripheral device to provide existing RS-232C-equipped terminals with off-line intelligence and memory storage.

Called Screenstor, the product reportedly links any host computer and terminal equipped with RS-232C ports to provide up to 100 pages of terminal memory with scrolling facilities, up to 100 pages of static memory storage off-line, parameter and character conversion features and

translation facilities to standardize different terminals.

The device contains an auxiliary port to control a slave printer or other serial device. The unit also provides battery backup of 2K bytes of parameter storage and reportedly will operate in the same environment as the connected terminal.

The device is priced at \$485.

Climax Computer, Suite 105-172, 4790 Irvine Blvd., Irvine, Calif. 92715.

SPERRY CORP.
Sperrylink Model 30
price cuts

Sperry Corp. has announced price reductions, effective immediately, for peripheral components on its

Sperrylink Model 30 desktop workstation.

Under the new pricing structure, a typically configured Sperrylink Desk Station, which includes a workstation, diskette subsystem, printer and appropriate software, has been reduced to \$7,869.

Additional price reductions are as follows:

■ Diskette expansion — a 10% price cut from \$700 to \$630.

■ Draft printer, 160 char/sec — a 32% price cut from \$1,875 to \$1,275.

■ Draft printer, 160/40 char/sec — a 34% price cut from \$2,125 to \$1,395.

■ Model 0431 Correspondence Quality Printer — a 23% price cut from \$2,641 to \$2,025.

■ Forms tractors — a 34% price cut from \$495 to \$329.

■ Cut sheet feeder — a 25% price cut from \$995 to \$745.

Sperry Computer Systems Operations, P.O. Box 500, Blue Bell, Pa. 19424.

NORTHERN TELECOM,
INC.
Displayphone enhancements

Northern Telecom, Inc. announced an enhanced keyboard and other features for its Displayphone terminal.

The keyboard was designed with full-size keys that operate like a standard-size keyboard. The keyboard extends in front of the Displayphone and can be stored inside when not in use, according to the company. Also, the key caps can be changed to accommodate special key designations for other terminal types, such as an on-line IBM 3278.

Other enhancements reportedly include a cap lock function that allows the user to lock the alphabetic character keys in the uppercase mode, while leaving the numeric keys unaffected; automatic logon with password entry; a terminal identification feature that enables the Displayphone to respond to various computer systems; and an 81-number directory that allows users to designate entries as either digitone or rotary dial calls.

The Displayphone costs \$1,295. Existing models can be upgraded with the new keyboard and features for \$150 per unit or with just the firmware for \$65 per unit.

Northern Telecom, P.O. Box 1222, Minneapolis, Minn. 55440.

PRINTERS/
PLOTTERSXEROX CORP.
9700 Model V; 8700 Model V

Xerox Corp. has announced enhancements for its 9700 and 8700 laser-printing systems.

The 9700 Model V and 8700 Model V reportedly produce higher quality output than standard 9700 and 8700 models because of an improved imaging subsystem and an advanced Xerographic engine.

The printers were designed for use with the Xerox graphics system, which enables photographs, line art and other illustrations to be merged with text to produce publications, reportedly within hours.

In the new printers, the subsystem is said to feature a more tightly focused laser beam for better control of the dots comprising an image.

Also, the Model V versions are said to use the Xerox 9500 Xerographic engine for a more efficient image transfer system.

The Model V printers are now available in New York, Chicago and Los Angeles, and will be available throughout the U.S. during the second quarter of 1984.

Purchase prices for the 9700 Model V start at \$412,000, while two-year leases for printing volumes of one million page/mo start at \$13,500/mo.

Purchase prices for the 8700 Model V start at \$226,000, with a two-year

Continued on page 70

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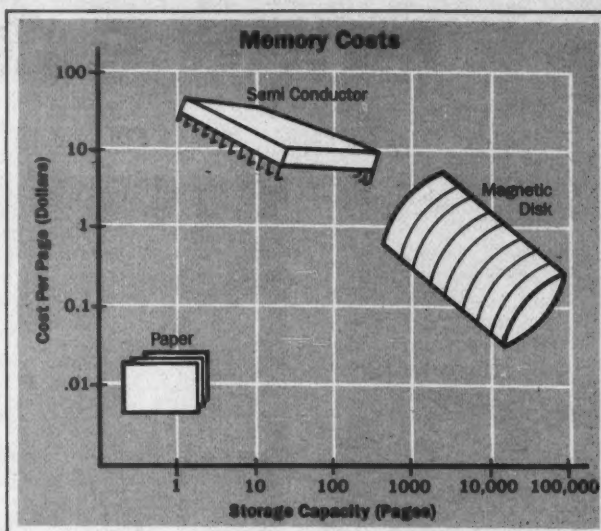


Figure 1

CW charts

MEMORY from page 63

memory can be put in dynamic RAM. The result is an increase in system performance.

How much memory is needed? The words for this article were typed on a portable computer that required only 2,500 bytes of memory to store the data.

Typically, 3,000 bytes are required for one page of text. Thus, each 256K-bit dynamic RAM chip could store approximately 10 pages of written material.

The bottom line is that if present trends continue, your data processing equipment will continue to improve in performance, cost less and occupy less desk or floor space.

These same trends will also allow the benefits of various artificial intelligence computing capabilities, such as Natural Language and Expert Systems, to become cost-effective and economically viable for a wide range of business applications.

Dicken is president of DM Data, Inc., a Scottsdale, Ariz., technology research firm.

Availability of Dynamic Random Access Memory Products

	1K Bits	4K Bits	16K Bits	64K Bits	256K Bits	1M Bits
Initial Units	1970	1973	1976	1979	1983	1986 est.
Price per bit (millicents)	1000	250	100	30	7	2

Table 1

MINIS from page 63

number of market forces said to be reshaping the computer industry, the report said. Chief among those forces are the accelerating trends in circuit density and speed and the increasing integration of computer and communications capability.

One area of predicted impact is market share. The total mini- and microcomputer market will increase from \$9 billion in 1982 to an estimated \$25 billion in 1987. But the share held by 16-bit minis will decline from 66% to 18%. Use of microcomputers, on the other hand, will increase from 6% to 48%, the study predicted.

Major Impact

For users, the major impact will be a plethora of products and suppliers capable of providing more computer and communications capability than most users can use. "Integration of these products and services into the corporate environment requires careful selection, procurement and installation planning," the report warned.

This planning should take into ac-

count overall corporate information goals and objectives, the proper role of the management information systems group and the human obstacles to widespread computer utilization. Moreover, such planning should not be left entirely in the hands of the DP staff, the report suggested.

Whether developed with the support of a management information systems group or independently, small-computer procurement policies are needed by even the smallest user, the study said.

"Failure to develop these will result in a costly proliferation of essentially similar, but incompatible, systems," the report said.

Procurement policies can be administered through the use of in-house channels of distribution such as centralized purchasing, an in-house computer store or volume purchase agreements. Product and supplier evaluation criteria should take into account the needs of inexperienced computer users.

The report costs \$985 from Electronic Trends Publications, located at Suite 372, 10080 N. Wolfe Road, Cupertino, Calif. 95014.

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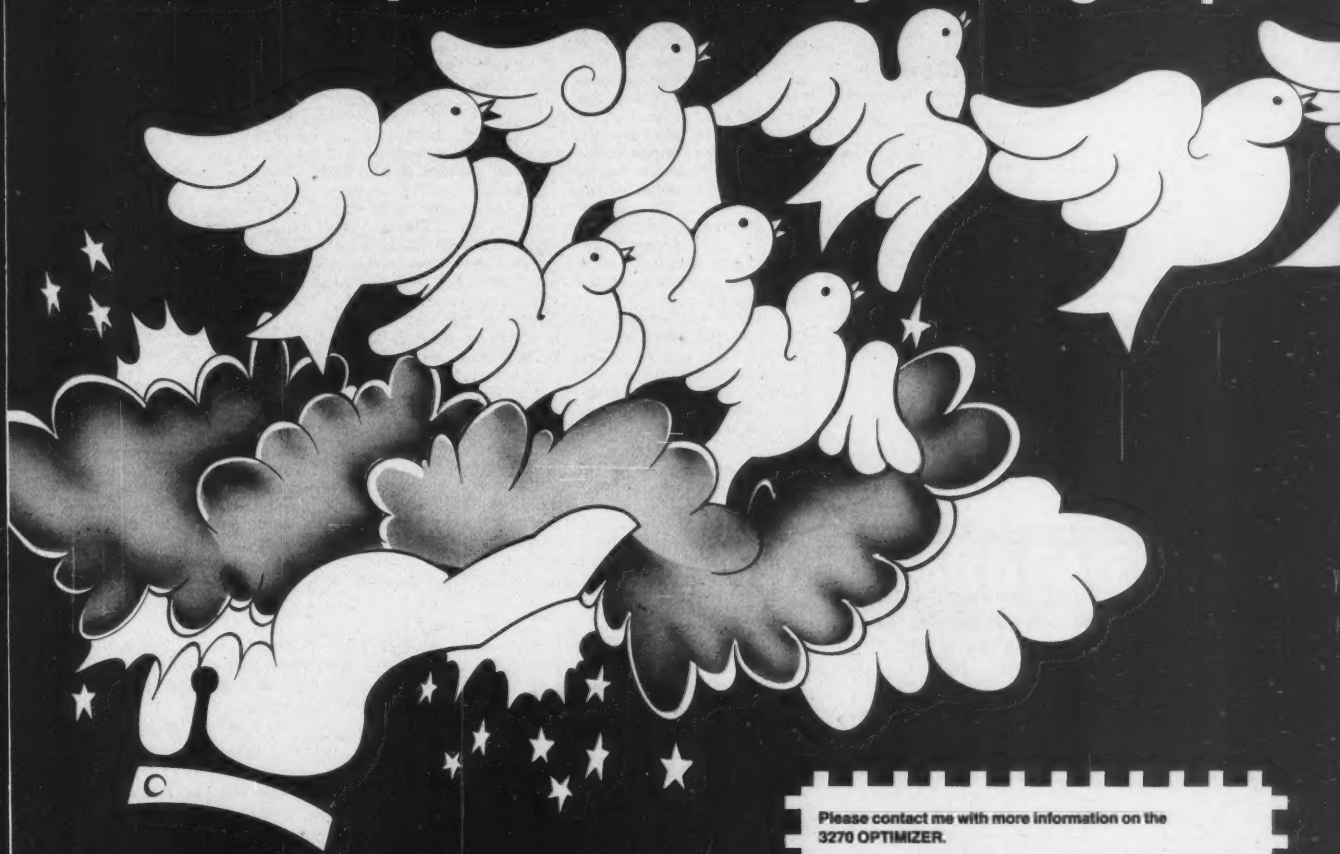
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SYSTEMS & PERIPHERALS

Continued from page 66
lease starting at \$7,400/mo with a monthly printing volume of 400,000 pages.

Xerox, Printing Systems Division, 880 Apollo St., El Segundo, Calif. 90245.

GRAPHICS SYSTEMS

WAYNE KERR, INC. Artworker

Wayne Kerr, Inc. recently announced Artworker, a stand-alone printed circuit board computer-aided design system.

Based on Mos Technologies, Inc.'s 6502 microprocessor, the Artworker system provides two levels of operation, according to a company spokesman: the "Designer" level, providing a

computerized version of a conventional drawing board with on-screen message functions guiding the operator at every step; and for more highly skilled operators, "Designer Plus," allowing the user to input connectivity information as components are placed on the layout and to place tracks on the board exactly where desired.

The product features 16 pad sizes, ranging from .02 in. to .5 in., and four pad shapes, said to provide greater precision in the design process. The spokesman said the product also has a virtually unlimited number of package styles and pad layouts.

Eight user-definable track and line widths are reportedly visible on the screen, and 17 layers of possible design space, with each layer measuring 25 in. by 25 in., re-

portedly provide room for silk-screen masters, drilling diagrams and solder masks in addition to actual printed circuit board layers.

The product is priced at \$24,950 and is available this month with a 30-day delivery.

Wayne Kerr, 400 W. Cummings Park, Woburn, Mass. 01801.

POWER SUPPLIES

RKS INDUSTRIES, INC. RLM power line monitor

RKS Industries, Inc. has introduced the RLM power line monitor, a device that alerts users to power condition changes in computer equipment lines.

According to the vendor, a high proportion of computer malfunctions are due to fluctuating power conditions — dips, spikes, surges and voltage changes. With the monitor, the faceplate indicates a change to dangerously low or high line voltage and voltage spikes or drops, via a red light and alarm.

The monitor plugs directly into the wall outlet and monitors the power entering a workstation computer or peripheral. It can be used before computer equipment is installed to determine the status of power in various parts of the facility, a company spokesman said.

The RLM monitor sells for \$245 per unit, with a 10% discount for quantities of five or more.

RKS Industries, 4865 Scotts Valley Drive, Scotts Valley, Calif. 95066.

TRANSWESTERN PRODUCTS CORP. Ultraguard series

Transwestern Products Corp. has announced an un-

interruptible power supply for business computers.

According to the vendor, the Ultraguard series is an ac-powered, battery backup power source for use with small computer systems and instruments that must remain operational during ac power blackouts. An indicator light gives continuous status of the power condition, and a tone alerts the user when the unit is operating on battery power.

Ultraguard provides up to 30 minutes of power to the computer system, allowing the operator to save current work in progress and shut the system down to avoid data loss or system damage, a company spokesman said.

The unit weighs 15 lb and provides 200W of uninterruptible power.

The price is \$649, with volume price discounts available.

Transwestern Products, 1711 Senter Road, San Jose, Calif. 95112.

K/W CONTROL SYSTEMS, INC. UPS inverter and controller module

K/W Control Systems, Inc. recently announced an uninterruptible power supply (UPS) inverter and controller module for its Piller 40K and 75K Vac 60 and 415 MHz frequency converters installed at sites utilizing IBM and AMDahl Corp. mainframes.

The module and an available battery package are reportedly field-installable and are said to extend the normal 500 msec power failure ride-through of the 60 and 415 MHz frequency converters up to 30 minutes or 15 minutes at full load.

The module reportedly monitors incoming utility line voltage, as well as the frequency at the terminals of the frequency converter.

Upon detection of below-acceptable power levels, the controller automatically transfers the input over to the battery inverter system, according to a company spokesman.

The inverter, control package and contactors are housed in a single enclosure designed to be mounted on top of or beside the frequency-converter cabinet.

The module is priced at \$15,500, and the price of the battery backup depends on configuration.

K/W Control Systems, R.D. No. 4, Box 114C, S. Plank Road, Middleton, N.Y. 10940.

DISCWASHER CO. Spikemaster

Discwasher Co. announced Spikemaster, a multimode surge protector.

The product works in common mode and differential modes, reportedly incorporating five surge-suppression devices with a five-part filter section. Spikemaster features four sockets, a circuit breaker, an on/off switch with indicator light, 15A backup capacity and a 6¼-ft cord, according to the vendor.

Spikemaster costs \$79.95. Discwasher, 1407 N. Providence Road, P.O. Box 6021, Columbia, Mo. 65205.

BOARD-LEVEL DEVICES

EMULEX CORP. TC05; TC15

Emulex Corp. has introduced the TC05 and TC15 tape couplers to provide software-transparent storage and backup capabilities for any of Digital Equipment Corp.'s LSI-11, PDP-11, VAX-11 or Micro/PDP-11 series

Continued on page 72

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SYSTEMS & PERIPHERALS

Continued from page 70

CPUs using Control Data Corp.'s Sentinel start/stop streaming ¼-in. cartridge tape drive.

Incorporating Emulex's bipolar, bit-slice microprocessor technology, the microprogrammed firmware on the board supports tape-streaming operations automatically, the vendor said.

Both couplers, when combined with the Sentinel drive, reportedly provide functional emulation of the DEC TS-11 tape subsystem, operating transparently to the standard DEC RSX-11M, RSX-11M-Plus, RSTS-E, RT-11 and VMS operating systems and diagnostic hardware. Both incorporate a 3.5K-byte buffer, are packaged on a single, quadwide printed-circuit board and require 5V at 6A. Tape transport is via a single 34-con-

ductor flat cable.

The TC05 embeds directly into a DEC Q-bus backplane slot of the LSI-11 and Micro/PDP-11 series computers. It supports 22-bit addressing, providing a 4M-byte memory capacity on the LSI-11/23 Plus and Micro/PDP. The TC15 embeds in a Unibus SPC slot of the PDP-11 or VAX-11 CPU.

List price for the TC05 is \$1,300/unit; the TC15 is \$1,400/unit.

Emulex, P.O. Box 6725, Costa Mesa, Calif. 92626.

FORCE COMPUTERS, INC.
SYS68K/Dram-2: SYS68K/CPU-2

Force Computers, Inc. has introduced two memory boards, the SYS68K/Dram-2 and SYS68K/CPU-2.

The Dram-2 contains 2M bytes of

random-access memory (RAM) on a double Eurocard form factor.

Standard features include byte parity checking with parity-fail indication; word and data transfers and access of 190 nsec (write) and 300 nsec (read).

The selectable base address for each of two memory banks includes mirror mode capability. The software-programmable access modes for each bank include read/write, read only, write only and no access, the vendor said.

The CPU-2 is a second-generation CPU board for the VME bus. It was designed for use in applications which require multiprocessor/multi-master capability, particularly in industrial control and multiuser micro systems.

The heart of the CPU-2 is the Mo-

torola Corp. 68000 microprocessor. The standard board is delivered with the 8Hz version, and optional processors include the 10 MHz 68000 or the 68010 unit with virtual memory capability. The CPU resides on an eight-layer double Eurocard.

One feature of the CPU-2 is 256K bytes of dual-ported RAM. The RAM allows asynchronous, high-speed access from the local processor bus, as well as from the global VME bus. The RAM is expandable to 1M byte.

The additional I/O channels on the CPU-2 consist of a serial I/O multiprotocol RS-232C interface with software-programmable bit/sec rates; a parallel interface with 24 bidirectional I/O lines; and an on-board floppy disk controller, which can handle up to four 5¼-in. disk drives.

Operating software systems for the CPU-2 from Force Computers are the SYS68K/Coherent, a multiuser operating system, and the SYS68/Rtosk, a real-time operating system.

The unit price for the Dram-2 is \$5,590; the CPU-2, including monitor, is \$1,795, according to the vendor spokesman.

Force Computers, Suite 150, 2041 Mission College Blvd., Santa Clara, Calif. 95054.

ARIUM CORP.
Memory option

Arium Corp. has introduced two configurations of a nonvolatile memory option for its ML4100 logic analyzer.

The ML4100 samples data up to 32 channels wide at speeds of up to 100 MHz and has timing, state and disassembled code displays. It includes a 32-channel logic pod, the vendor said.

The basic setup memory option saves eight complete machine setups in permanent storage, even when the power is turned off, making it useful for field work and production testing, a company spokesman said.

The expanded version of the option includes the setup memory option plus an A/B memory option, which provides the ability to save, store, recall and edit a whole captured data memory set.

The basic nonvolatile memory option sells for \$485, with the expanded version costing \$795. Delivery is four weeks after receipt of order.

Arium, 1931 Wright Circle, Anaheim, Calif. 92806.

AUXILIARY EQUIPMENT

**UNITED SOFTWARE
SECURITY, INC.**
Lazerlock

United Software Security, Inc. has announced Lazerlock, a hand-held decoder designed for computer security.

Lazerlock safeguards personal computers, mainframes and remote terminals, according to the vendor. Systems that use Lazerlock can insert security checks at any point in a program. Lazerlock does not use passwords or hardware encryption, according to the vendor.

Lazerlock is priced between \$100 and \$200, depending on the features required.

United Software Security, 6867 Elm St., McLean, Va. 22101.

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MICROCOMPUTERS

Speech systems gaining ground

MICRO BITS

THOMAS
MADRON

Speech systems are likely to become the major new I/O devices of microcomputing in the middle to late 1980s.

In the quest for user-friendliness, a number of devices have been proposed over the last few years. We have seen menu systems depending on key strokes, light pens, mice, touch screens and now, after 10 or 15 years of development, cost-competitive speech systems on microcomputers. Few techniques are more natural than being able to give a computer voice commands.

The ability to talk to a computer has been an image presented to us in science fiction for many years. HAL, the mentally ill computer in *2001, A Space Odyssey* by Arthur C. Clarke, depicted the computer as a villain. Then there was Mr. Spock's talking computer on board the *Enterprise* in the television show *Star Trek*. Those science fiction computers of the 60s possessed the ability to accept intelligent speech commands as well as to synthesize speech in order to respond to requests.

Fluent conversational speech recognition and response of the kind used on the *Enterprise* involve what artificial intelligence researchers have termed a "model of the domain of discourse" resulting in a recognition process called "understanding." The actual devices on the market in 1984, by way of contrast, are much simpler, using a pattern-matching technique rather than understanding.

Speech recognition can be defined in various ways. There are speaker-dependent and speaker-independent systems. HAL, in *2001*, used a speaker-independent approach — it was able to recognize the speech of all the crew members. Many of the contemporary 1984 systems are speaker dependent — they must be trained to recognize the speech of a single individual. The computers in both *2001* and on the *Enterprise* were also

See **SPEECH** page 74

Macintosh spurs software From third-party vendors

By Jeffry Beeler
CW West Coast Bureau

Though officially introduced only two weeks ago, Apple Computer, Inc.'s Macintosh supermicro has already spurred the announcement of an assortment of third-party software packages and independently developed peripherals.

On the software side, the newly available Macintosh accessories include revised versions of five existing Microsoft, Inc. applications and a raft of other third-party packages, including:

- Xenix, Microsoft's Unix look-alike operating system, which will be supported by the recently introduced Lisa 2/10.

- An interactive, multitasking program development system from Creative Solutions, Inc.

- A rewrite of Software Publishing Corp.'s PFS line of information management programs.

On the hardware side, the list of independently supplied Macintosh-compatible accessories includes two peripherals from Tecmar, Inc. — a 5M-byte removable cartridge subsystem and a Bell 212A-compatible modem interface that reportedly replaces traditional telephones. Also available as peripherals with Apple's smallest

32-bit micro is a family of Davong Systems, Inc. hard disk modules capable of storing 5M to 40M bytes.

Ranging in estimated price from \$1,995 to \$4,500, the Davong disk systems will become available during the first quarter. Davong is located at 217 Humboldt Court, Sunnyvale, Calif. 94086. The Tecmar cartridge subsystem and phone modem interface cost approximately \$2,000 and \$300 to \$500, respectively, and will be available late in the first quarter or early in the second from Tecmar at 6225 Cochran Road, Cleveland, Ohio 44139.

Macintosh also reportedly comes with an intelligent, front-end processor that allows the Apple micro to communicate with IBM or IBM-compatible central mainframes. Winterhalter, Inc.'s Data Talker II enables the personal computer to emulate IBM's 3200 series interactive displays as well as a broad selection of the industry giant's remote-batch terminals, according to a Winterhalter source.

With documentation, warranty and installation, the micro-to-mainframe link retails for \$995 and can be obtained from Winterhalter at 3853 Research Park Drive, Ann Arbor, Mich. 48104.

See **APPLE** page 86

How are corporate micros working?

The dust from the corporate microcomputer boom is finally starting to settle. For many firms, the mad dash to buy and install microcomputers is giving way to developing plans for coordinating and controlling microcomputer use.

How are microcomputers working out in your organization? *Computerworld* will publish its second annual "Micros in Big Business" Special Report this April. This special section will focus on the success and failure of micros in large organizations. Included will be articles covering: micro-to-mainframe links, microcomputer networks, compatibility issues and the growing concern of security and data protection.

If you have a story you would like to

share (either bitter or sweet), *Computerworld* would like to hear from you. Contributions should take one of two forms: a tutorial article discussing an issue or trend in corporate microcomputing, or a user story outlining a firm's experience with micros.

Articles must be typed, double-spaced and no longer than eight pages. Artwork, such as charts, graphs or photographs, is encouraged. Authors should also include a brief biography and a phone number where they can be reached.

The deadline for submissions is March 5. Articles should be addressed to: Donovan White, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

IBM

IBM said it has begun volume shipments of its PCjr micro along with a dozen programs. In addition, IBM announced a free, dial-up assistance service for novice users and a \$380 subscription software service that offers dial-up technical aid and a monthly newsletter.

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MICROCOMPUTERS

SPEECH from page 73

able to recognize connected words rather than being limited to individual words separated by silence. Human speech and hearing deal mostly with the recognition and generation of connected words. Computers with the ability to recognize connected words are a reality in 1984.

The wedding of telephone technology with microcomputing is a somewhat natural outgrowth of the commercial availability of reasonably priced speech systems. Managers and other information workers spend a great deal of their time using the telephone. The ability to manage the use of the telephone, and the tools for doing so, can be an important means for productivity improvement. A major application, therefore, will likely be

the use of a microcomputer as a super-intelligent telephone.

The product that engendered a certain amount of excitement for me was the introduction of the Speech Command System (SCS) for Texas Instruments, Inc.'s Professional Computer late last year. Not long after its introduction, I was able to obtain a speech command board and the associated software to review the system. At a list price of about \$2,600, SCS is not an inexpensive peripheral, but it costs considerably less than many other commercial speech products.

At its inception, the SCS provided software support for three basic speech functions: telephone management, telephone sending and answering services and a transparent keyboard utility. The software package also includes a primitive daily calen-

dar program as a throwaway since it doesn't use or depend on speech.

Part of the transparent keyboard facility is the ability to deal with the telephone through the "smartphone" option, which makes it possible to answer the phone (using a headset) with the computer. It is also possible to associate a spoken word or phrase with a telephone number. When the word is spoken, the associated phone number is dialed automatically. The numeric keyboard of the Professional can also be used as a normal telephone keypad when speech recognition has not been invoked.

Other telephone controls allow the user to transcribe a message, record it digitally on disk, then have the processor dial one or many phone numbers and deliver the message. In an office environment with several

TI micros, it would be possible to set up a system of electronic mail using speech rather than written documents.

The SCS, through the use of the transparent keyboard facility, allows the association of spoken commands with characteristic keystrokes. The structure of the system is such that it uses a pattern-matching scheme, but can still cope with connected speech patterns.

Speaker-dependent system

A related set of commands are grouped together in a vocabulary. When a word is added to a vocabulary, it must first be enrolled, then trained through an updating process. It is, therefore, a speaker-dependent system. It is possible for me to speak the words, "Get me the directory on the Winchester," to obtain a directory listing. "Directory" and "Winchester" are keywords which are now accessible through the use of the SCS, but they can only be selected out by SCS when embedded in a larger document.

As implemented on the TI micro, speech recognition is limited to vocabularies of 50 words or phrases. Up to nine vocabularies can be active at any one time, depending on memory, so the 50-word limitation is not very severe. A technique is provided to go from one vocabulary to another.

While the SCS has voice synthesis capabilities, they are not implemented as general-purpose tools, although the speech playback features of the system are termed synthesis by the documentation.

TI has opted to produce a software development system that allows programmers to build new applications, but the price of that system is purported to be around \$8,000. It was initially designed for the use of software developers. That price tag not only inhibits individuals from using it, but could retard development because it cuts out many small software houses.

Whatever its shortcomings, the SCS is an exciting product. It is also unique in terms of the price compared with the capabilities of the system. It could be improved by providing a speech synthesis capability similar to that used by Votrax, Inc.

Keyboardless uses

In addition to providing a user-friendly computer environment, speech systems will likely find great use in situations where the user cannot be bothered by the keyboard (in some manufacturing processes, for example), for unique assistance to the handicapped and to simplify the tasks required in some jobs.

Over the next decade, I suspect that we will see speech systems become common on a wide variety of computers. The ability to talk to your computer will go a long way in providing a truly user-friendly computing environment.

Madron is manager of computer services at North Texas State University, Denton, Texas.

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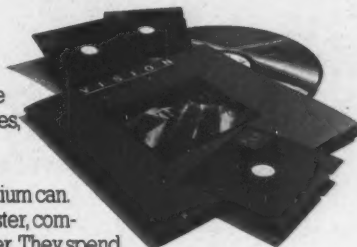


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19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe, write to Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03185, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.



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COMPAQ™

MICROCOMPUTERS

Geisco joins ranks of IBM remarketers

ROCKVILLE, Md. — Continuing a trend of time-sharing vendors marketing specialized versions of IBM Personal Computers, General Electric Information Services Co. (Geisco) has thrown its hat into the IBM value-added remarketer arena.

According to a Geisco spokeswoman, the company will offer Personal Computers along with systems consulting, assistance in hardware selection, installation, testing and training on custom and package applications. The spokeswoman added that a typical configuration available through Geisco includes the IBM Personal Computer or Personal Computer XT, modem, graphics printer and communications software.

Depending on the configuration, prices begin at approximately

\$6,000, plus application software.

In connection with the announcement, Geisco introduced what it called four software enhancements for the IBM Personal Computer. The enhancements include the Time Sharing Interface (TSI) Version 2.0, which was described as a communications package to link the microcomputer to General Electric Co.'s worldwide teleprocessing network.

Geisco also made available Tabol, a financial management system that features a file option that enables it to read or write data files compatible with Visicorp's Visicalc package. The Tabol-Visicalc interface provides a

means to consolidate multiple sets of Visicalc data, and it allows Visicalc data files to feed Tabol production application systems. Data transfer from Visicalc to Geisco's Mark III teleprocessing service is said to allow for more complex Tabol processing, reporting, consolidation, data base management and graphics.

Geisco's Fortran Subroutines Library includes hardware-related routines such as the ability to modify keystroke functions for creating boxes and windows, creating graphics and managing communications and files.

The IBM Personal Computer Hier-

archical Indexed Sequential Access Method (Hisam) data base software introduced by Geisco facilitates development of applications that couple Geisco Mark III Service hosts and the Personal Computer, according to the spokeswoman.

For Geisco clients, TSI Version 2.0 is priced at \$50 a copy, the Fortran Subroutines Library is priced at \$495 and the Personal Computer-Hisam system is priced at \$300. The Tabol Visicalc interface is included in the cost of Geisco's Mark III teleprocessing service.

Geisco, 401 N. Washington St., Rockville, Md. 20850.

Phaze unveils Gemini, boasts IBM capability

SCOTTSDALE, Ariz. — Phaze Information Machines Corp. has introduced its 3270/Business Computer called Gemini.

According to a company spokesman, the system combines the capabilities of an IBM 3278 CRT terminal with IBM Personal Computer-compatible operations and software.

Gemini can alternate between concurrent 3270 and Personal Computer modes via single keystroke keyboard commands without loss of session. The file transfer capability allows for the transfer of data from the mainframe to the personal computer for editing and for the return of that information to the host.

The extended capabilities of Gemini permit the data transfer to be performed in a number of different ways.

As a business computer, Gemini uses an array of software compatible with the IBM Personal Computer, including Lotus Development Corp.'s Lotus 1-2-3, Microsoft, Inc.'s Multiplan, Visicorp's Visicalc, Micropro International, Inc.'s Wordstar and Metasoft Corp.'s Benchmark, according to the spokesman.

Two 5¼-in. 320K-byte disk drives and 128K bytes of random-access memory (upgradable to 256K bytes) are standard features of Gemini, which will operate under MS-DOS, PC-DOS and CP/M 86.

Gemini connects directly to IBM 3274 or 3276 controllers via coaxial cable. It supports light-pen functions and has additional features such as reverse video, attribute display, automatic video shutdown and security key lock.

The Gemini uses an 87-key typewriter keyboard with 24 program function keys as standard features; other options are available, the vendor noted.

Gemini will be available for shipment the first of the year. The single-unit price is \$4,250.

Phaze Information Machines, 7650 E. Redfield, Scottsdale, Ariz. 85260.

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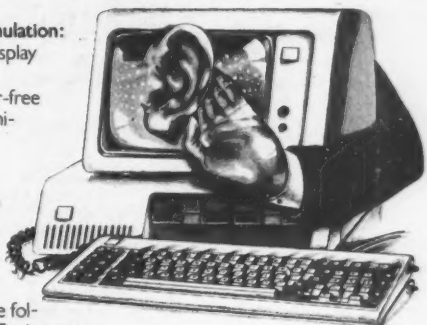
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MICROCOMPUTERS

Fujitsu unveils Micro 16s | MDB Micro/32 debuts

LOS ANGELES — Fujitsu Systems of America has introduced the Fujitsu Micro 16s, a microcomputer which incorporates both 8- and 16-bit microprocessors.

According to the vendor, the microcomputer is suited for use with the firm's 7880 and 7990 point-of-sale terminals and 7110 terminal-support processor. It incorporates interchangeable microprocessors, including an 8-bit Zilog, Inc. Z80A microprocessor and an Intel Corp. 16-bit 8086 microprocessor.

The system offers 128K bytes of memory, which can be expanded to 1M byte of internal storage. It features two minifloppy disk drives

with 320K bytes of auxiliary memory on each and a 98-key keyboard, including 10 user-programmable keys and a separate numeric pad, the vendor said.

The Micro 16s comes standard with Digital Research, Inc.'s CP/M 86 operating system and is bundled with Micropro International Corp.'s Wordstar word processing program, Sorcim Corp.'s Supercalc 2 electronic spreadsheet and Digital Research's GSX graphics software.

The base system price of the Micro 16s is \$3,695.

Fujitsu Systems of America, 9841 Airport Blvd., Los Angeles, Calif. 90045.

ORANGE, Calif. — MDB Systems, Inc. has introduced the MDB Micro/32, a 32-bit computer system that features the Motorola, Inc. 68000 microprocessor and the vendor's Regulus, a Unix-compatible operating system.

The MDB Micro/32 contains a single quad-size CPU board and 512K bytes of random-access memory.

The Regulus operating system features user source compatibility with Unix V6, 7 and System III and offers support of all Unix kernel features, multikey B-tree Isam and Digital Equipment Corp. VAX/PDP-11 cross-support, according to a vendor spokesman.

The MDB Micro/32 is priced at \$11,995, including a Regulus user license. Discounts for quantity purchases are available, the spokesman said.

MDB Systems, 1995 N. Batavia St., Orange, Calif. 92665.

SYSTEMS

D.J. DESANDRO & CO., INC. Simple Librarian System

D.J. DeSandro and Co., Inc. recently introduced software and hardware package designed for applications where extensive cross-referencing is desired, such as for libraries, medical offices, legal offices and so forth.

The Simple Librarian System includes an OSM Computer Corp. Zeus 4 microcomputer with a 1.2M-byte, 5¼-in. floppy disk drive and 5¼-in. hard disk drive. Storage capacities range from 6.3M bytes to 25M bytes. Also included with the system is OSM's Muse operating system with features said to be similar to Digital Research, Inc.'s CP/M and MP/M systems.

A basic package includes the Zeus 4, two CRT terminals and one letter-quality printer for \$10,000. The system reportedly can support up to 10 CRT terminals.

D.J. DeSandro and Co., P.O. Box 19786, Houston, Texas 77027.

SWEDA INTERNATIONAL, INC. 9800 Retail Control System; Sweda Business System

Sweda International, Inc., a division of Litton Industries, has introduced the 9800 Retail Control System and the Sweda Business System. The two products are aimed at point-of-sale users.

The 9800 Retail Control System is said to be a general-purpose, distributed processing computing system consisting of up to 64 microprocessor-based devices integrated into a dedicated local-area network, the vendor said.

Musys Corp.'s Turbodos operating system controls the multiuser network and shares a common pool of 5¼-in., slim-line and full-height mass storage devices. Configurations from a single 320K-byte floppy disk through multiple drives with up to 600M bytes of storage are offered, the vendor said.

The 9800 series point-of-sale terminal is also programmable in higher level languages, the vendor said. The local-area network utilizes coaxial cable and operates at a data rate of 800K bit/sec., utilizing carrier-sense, multiple access/collision detection, according to a spokesman for the vendor.

The Sweda Business System was designed to integrate a range of Sweda point-of-sale devices, including the 9800 Retail Control System, with local and corporate-level processing capabilities.

The basic Sweda Business System includes an 8-MHz, 16-bit processor, 256K bytes of memory, monochrome CRT, keyboard, RS-232-C serial ports, a parallel printer port and a universal power supply. Optional

Continued on page 82

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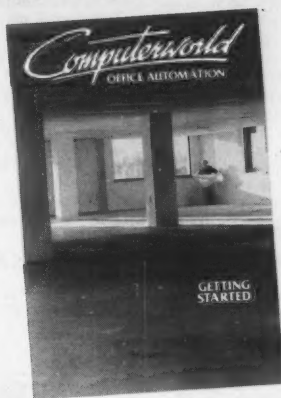
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Nicole Boothman (recruitment), (415) 421-7330

LOS ANGELES/Bernie Hockswender, Bob Hubbard, Bill Healey (714) 261-1230

MICROCOMPUTERS

Continued from page 80

hardware components include 256K bytes of memory increments, an 8-color CRT with bit-mapped graphics, 5¼-in. floppy disk drives and various floppy/rigid disk drive combinations, the vendor said.

The Retail Control System costs \$3,000, and the basic Sweda Business System costs \$3,000.

Sweda International, 34 Maple Ave., Pine Brook, N.J.

MOSTEK CORP. VME Matrix 68K

Mostek Corp. has introduced a multiuser system designed around the firm's MK68000 microprocessor.

The VME Matrix 68K combines the expandable 16-bit VME bus with the Unix operating system, meeting the requirements of current 16-bit applications. The unit can be expanded to support 32-bit applications in the future.

According to the vendor, the system features a 10-slot card cage with three slots available for system expansion, allowing the user to select those functions needed for a specific application. It has 640K bytes of main memory and five serial ports.

A 36M-byte Winchester disk drive and a 5¼-in. double-sided, double-

density floppy disk drive are also supplied with the system.

The single-unit price is \$16,500. Mostek, 1215 Crosby Road, Carrollton, Texas 75006.

PRINTERS/ PLOTTERS/ PERIPHERALS

FUTURENET CORP. D1 Plotter

Futurenet Corp. has introduced D1 Plotter, a pen-plotter interface which prints graphics created with an IBM Personal Computer on Hewlett-Packard Co.'s 7580, 7585 or 7470 plotters.

The interface works Futurenet's Dash-I Schematic Designer and produces C- and D-size schematics for engineers, according to the vendor. The interface produces output on sheets of paper, vellum or double-matted polyester film.

The interface is priced at \$600. Futurenet, 21018 Osborne St., Canoga Park, Calif. 91304.

BLUE CHIP ELECTRONICS, INC. Model M120/10

Blue Chip Electronics, Inc. has an-

nounced a 120 char./sec dot matrix printer designed for direct interface with the Commodore Business Machines, Inc. Commodore 64 personal computer.

The Model M120/10, now available, has a standard Centronics Data Computer Corp. parallel interface

STEARNS COMPUTER SYSTEMS CORP. Optional 64-line feature

Stearns Computer Systems Corp. has added an optional 64-line feature to its 12-in. or 15-in. terminals. The terminals are used on the firm's desktop microcomputer.

The 15-in. terminal features full-page, white-on-black display. The 12-in. terminal uses black-and-white, green, amber or eggshell characters. A 15-in. display is also available.

The terminals, with expansion board and software, add approximately \$1,300 to the purchase price of a Stearns microcomputer.

Stearns Computer Systems, 10901 Bren Road, Minnetonka, Minn. 55343.

and the capacity to accept optional RS-232C serial and IEEE-488 interfaces.

The suggested retail price for the printer is \$349.

Blue Chip Electronics, 7406 E. Butherus Drive, Scottsdale, Ariz. 85260.

STORAGE

APPLE COMPUTER, INC. Duodisk

Apple Computer, Inc. has introduced a floppy disk drive unit that contains two half-high, 140K-byte drives side-by-side in a single case.

Called Duodisk, the unit offers compatibility with Apple II software. A spokesman said the unit costs less than two separate Disk II drives. The Duodisk meets the dual-drive configuration needed for many software programs, the vendor said.

Duodisk is the same width as the Apple II and can be placed between the computer and the monitor. Technical features include a disk-ejection

mechanism and an advanced head-positioning mechanism that, according to the vendor, gives a more precise reading of half-tracks.

Duodisk comes with a controller card that connects it to any Apple II, Apple II+ or Apple IIe.

Apple Computer, 10260 Bandley Drive, Cupertino, Calif. 95014.

BOARD-LEVEL DEVICES

VIRTUAL MICROSYSTEMS, INC. Spectrum

Virtual Microsystems, Inc. has announced Spectrum, a board which transforms a Digital Equipment Corp. VT-100 terminal into a microcomputer.

Spectrum features 512K bytes of random-access memory, Intel Corp.'s 80186 and 8088 and Zilog, Inc.'s Z80 microprocessors, according to the

The 80186 microprocessor provides back-end host communications at a speed of 56K bit/sec. The 8088 provides 256K bytes of storage for Microsoft, Inc.'s MS-DOS operating system. The Z80 allows the user to run programs on Digital Research, Inc.'s CP/M operating system.

Spectrum does not include a floppy disk drive, so any microcomputer software has to be loaded by a hardware utility and accessed by the terminal.

The board costs \$2,450; main-frame software prices range from \$1,600 to \$3,500.

Virtual Microsystems, Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

CURTIS, INC. Romdisk

Curtis, Inc. has announced Romdisk, an accessory card for the Apple Computer, Inc. Apple II that provides one full diskette of user-stored program files loaded in erasable programmable read-only memory (Eprom).

With Romdisk, a menu-builder program is provided to allow selection of the program files to be loaded, and Romdisk can automatically generate the menu or desired program file.

Romdisk may be used in on-line systems and is said to allow Apple II microcomputers to be used as workstations without handling diskettes. Up to four Romdisks can be used in one microcomputer, the vendor said.

Romdisk requires either the DOS 3.33 or Prodos operating system and will allow programs that can be copied using operating system utilities to be user-loaded into the Romdisk Eprom memory.

Romdisk is priced at \$499. Curtis, 22 Red Fox Road, St. Paul, Minn. 55110.

HEURIKON CORP. MLZ-92A

Heurikon Corp. has announced a single-board processor designed to run multiuser operating systems without additional cards on its Intel Corp. multibus systems.

The MLZ-92A is now available for OEMs and for sale as a stand-alone unit, according to the company.

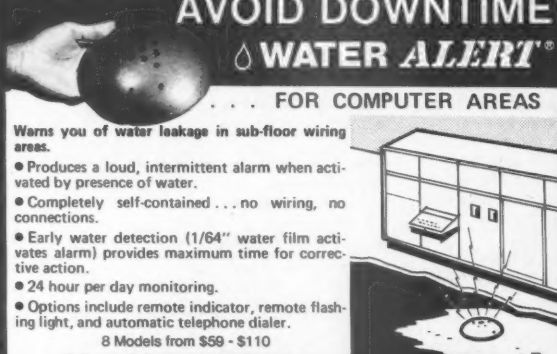
The MLZ-92A features the Zilog, Inc. Z80A microprocessor and Digital Research, Inc.'s CP/M operating sys-

Continued on page 84

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How the Stratus Hardware Solution Supersedes the Software Solutions.

Stratus's hardware design means that fault tolerance is invisible to your application programs and users. You can even move previously developed applications to Stratus with NO CHANGES and NO PERFORMANCE LOSS for fault tolerance. In contrast, the software-based systems require complex, performance-stealing software in order to implement fault tolerance. This means that new programs are more difficult to develop, they run slower, and existing programs can't be

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An added benefit of the Stratus fault tolerant design is that you can expand your system with additional processors as your computing needs grow. In fact, you can have up to 32 fault tolerant processors, 2000 communication lines, and 100 billion bytes of storage in a single Stratus system.

Hardware Self-checking Causes a Breakthrough in Service.

Each Stratus/32 tests itself EIGHT MILLION TIMES A SECOND while it executes your programs, so faults are detected BEFORE they corrupt your data. And when there is a failure, there's no need to rush to call your Stratus service technician. For one thing, the failed component, be it a CPU, controller, disk, or power supply, has a partner that continues operations as usual (without slowing down the system), so there's NO DOWNTIME. In addition, repairs can be made WITHOUT STOPPING THE SYSTEM. It is so easy to repair a Stratus/32 that our service is provided at about one-half the average price charged by other computer manufacturers.

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Our prices are competitive with "normal" systems (i.e. ones that do not provide fault tolerance), and substantially lower than the software-based fault tolerant systems. \$140,000 buys you a complete four megabyte 32-bit system with 60 megabytes of disk storage, magnetic tape drive, and system SOFTWARE. If you like our hardware, you will be even more impressed with our software. (A common reaction among our users.) Briefly, our software offering includes VOS (a virtual operating system), transaction processing, networking, IBM communications, data management system, interactive forms builder, symbolic debugger, COBOL, Basic, PL/I, Fortran, Pascal, word processing. . .

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it needs a computer it can rely on.

MICROCOMPUTERS

Continued from page 82

tem. It is said to have 128K-byte parity, protected random-access memory and the ability to access 1M byte through its 20-bit, memory-mapped multibus interface.

Off-card I/O can be accessed through the I/O map, and hardware arbitration allows communication with the multibus in the master, slave or multimaster mode, according to the company.

It features four RS-232 serial ports, two of which can be configured for RS-422, while an optional Centronics Data Computer Corp.-compatible parallel interface is available.

The MLZ-92A is priced at approximately \$1,150 in quantities of 100.

Heurikon, 3001 Latham Drive, Madison, Wis. 53713.

from the vendor for \$75 each.

Fliptrack Learning Systems, Suite 200, 999 Main St., Glen Ellyn, Ill. 60137.

PRENTICE CORP. Popcom Model X100

Prentice Corp. has announced the Popcom Model X100 communications modem for users of personal computers and microcomputers.

The voice and data-handling feature of the modem includes call-progress monitoring and detection for dial tones, busy signals, remote ringing, voice, data and line-current disconnect. The modem is compatible with 103, 113 and 212A dial-up modems and connects to all standard single- and multiline phone equipment, the vendor said.

The modem offers compatibility with currently available communications software packages and adapts to a variety of RS-232 interface cables, according to the vendor. The price is \$475.

Prentice, 266 Caspian Drive, P.O. Box 3544, Sunnyvale, Calif. 94088.

MEMOREX CORP.

Type D, Type E disks; head-cleaning system; data cassette

Memorex Corp. has announced single- and double-sided 5¼-in. floppy disks, both with 96 track/in., a 5¼-in. disk drive head-cleaning system and a 15-min. data tape cassette.

The single-sided Type D and double-sided Type E disks are said to provide twice the storage capacity of standard double-density disks. The

head-cleaning system is inserted as an ordinary disk for 30 seconds and may be used up to 30 times. The data cassette provides storage of up to 72K bytes and is said to provide faster data loading and access.

Suggested prices are: Type D disk, \$49.99; Type E disk, \$68.99; head-cleaning system, \$21.49 for package of 10; and data cassette, \$3.39.

Memorex, San Tomas at Central Expressway, Santa Clara, Calif. 95052.

MICRO SOFTWARE

SOFTWARE PUBLISHING CORP. PFS:Access

Software Publishing Corp. recently announced a software communica-

AUXILIARY EQUIPMENT

COMPUTER LITERACY, INC. Compututorial

Computer Literacy, Inc., an educational systems company, has introduced audio cassette training programs called Compututorial.

The first Compututorial has been developed to train users of the PFS: File program on the IBM Personal Computer. The package provides marketing opportunities for the retailer, a company spokesman said.

Compututorial is priced at \$39.95.

Computer Literacy, P.O. Box 43145, Cincinnati, Ohio 45243.

MICRO LOGIC CORP. Micro Chart No. 7

Micro Logic Corp. has introduced the Micro Chart, a plastic reference card for programming Intel Corp. 8086 and 8088 microprocessors.

According to the vendor, the card is No. 7 in a series and covers conversion of instructions to and from hexadecimal instruction descriptions, cycle time, addressing modes, flag codes and diagrams on a two-sided, two-color, full-page sheet.

Micro Chart No. 7 costs \$5.95, plus \$1 for postage.

Micro Logic, P.O. Box 174, 100 Second St., Hackensack, N.J. 07602.

FLIPTRACK LEARNING SYSTEMS

Audio cassette tutorials

Fliptrack Learning Systems has published audio cassette tutorials for users of the IBM Personal Computer XT using Lotus Development Corp.'s 1-2-3 financial spreadsheet package.

"How to Operate the IBM XT" was designed to teach the user how to utilize the XT's special keys and commands; load and run basic programs; format, copy and check diskettes; and copy, rename and erase individual files.

"How to Use Lotus 1-2-3" instructs the user on all the essential 1-2-3 commands and built-in functions needed to develop spreadsheets, data bases and graphics presentations. It also discusses how to sort and select entries and how to display and print results in a variety of formats, the vendor said.

Both tutorials consist of four spoken-voice cassettes that require about two hours each and may be played on any standard cassette player. The tutorials are available



MICROCOMPUTERS

tions package said to provide data encryption along with access to dial-up services for users of microcomputers running under Microsoft, Inc.'s MS-DOS and on Apple Computer, Inc.'s Apple IIe.

PFS:Access reportedly stores dial-up and logon sequences to connect users automatically to frequently used services, including electronic mail services provided by Western Union Corp.'s Easylink and MCI Communications Corp.'s MCI-Mail; data base services provided by Dow Jones & Co.'s Dow Jones News Retrieval, Source Telecomputing Corp.'s The Source and CompuServe Corp.'s CompuServe; and BankAmerica Corp.'s Home Banking service.

Users reportedly can select connection to a service by pushing one key. The package works with many

serial interface cards and supports most popular modems with 300 bit/sec and 1,200 bit/sec transmission speeds, according to a spokesman for Software Publishing.

The MS-DOS version will be available in March for a suggested retail price of \$95, and the Apple version will be available in May for a suggested retail price of \$70.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94043.

RESPONSE, INC. PC/Coder Version 2.06

Response, Inc. recently announced an enhanced release of its program development system for the IBM Personal Computer and Personal Computer XT that reportedly includes a

20% to 25% faster program generation routine.

Release 2.06 of PC/Coder also provides function key usage and additional user-defined error trapping routines, according to a company spokesman.

The enhanced version is available to licensees of previous versions at no charge. PC/Coder is priced at \$460.

Response, 608 2nd St., Jackson, Minn. 56143.

VIA COMPUTER, INC. Micro/Prophit

Via Computer, Inc. has introduced Micro/Prophit, a financial modeling system for the IBM Personal Computer and Personal Computer XT.

According to the vendor, the sys-

tem was previously only available through Control Data Corp.'s time-sharing services.

Micro/Prophit is an enhanced version of the vendor's Prophit II, expanding its power and capabilities. It is an alternative to planning tools such as Lotus Development Corp.'s Lotus 1-2-3 and Visicorp's Visicalc, a company spokesman said.

According to the vendor, Micro/Prophit uses an MS-DOS operating system with a minimum of 192K bytes of memory. The package allows users to develop model sizes of up to 9,000 lines by 135 col.

Micro/Prophit is priced at \$695. *Via Computer, 7177 Construction Court, San Diego, Calif. 92121.*

NOVELL, INC. Netware/O

Novell, Inc. has announced that its network operating system software, featuring a mainframe-like file server with security management capabilities, is now available for the Corvus Systems, Inc. Omninet network.

The package, called Netware/O, allows up to 64 IBM Personal Computers, Personal Computer XT's or similar systems to share up to 150M bytes of disk storage attached to a central Netware file server.

Netware/O provides information-sharing functions to support transaction processing, record locking and direct communications between networked stations.

It also administers printing tasks to shared printers, maintains duplicate directories and provides utilities to recover files that are accidentally erased.

Netware/O supports IBM PC-DOS 1.1, PC-DOS 2.0 and Digital Research, Inc. CP/M 86 operating systems, all of which can be used on one network without partitioning the shared disk, according to Novell.

Each microcomputer workstation requires a minimum of 64K bytes of memory.

Netware/O costs \$1,495. *Novell, 1170 N. Industrial Park Drive, Orem, Utah 84057.*

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MICROCOMPUTERS

APPLE from page 73

Microsoft's contribution to Macintosh's lineup of third-party software includes its Multiplan spreadsheet package, Basic programming language, Word text processing program, Chart and File. Formally introduced at Apple's Jan. 24 shareholders' meeting, all five products have long been available with IBM's Personal Computers and have recently been modi-

fied to support all the features of Macintosh's user interface, according to a Microsoft source.

Multiplan costs \$195 and like Basic, which sells for \$150, is available now. Word and File also retail for \$195 each but will remain unavailable until the second quarter. Sales of Chart, priced at \$125, will begin in March from Microsoft at 10700 Northup Way, Bellevue, Wash. 98004.

Like its IBM-compatible predecessors, the Macintosh version of Software Publishing's PFS:File and PFS:Report. File aids information management through its filing, sorting and searching features, while Report summarizes information and performs necessary calculations. Both products retail for approximately \$100 and will become available during the second quarter from Soft-

ware Publishing, which is located at 1901 Landings Drive, Mountain View, Calif. 94043.

Also intended to operate with Apple's entry-level, 32-bit micro is Creative Solutions' Mac-Forth, a software development system that reportedly combines the best features of the Forth programming language with Macintosh's windowing capability, menus, mouse support and file structure. A

Mac-Forth license sells for \$250 from Creative Solutions, located at 4801 Randolph Road, Rockville, Md. 20852.

Third-party tools target Macintosh

Third-party software packages from smaller vendors will also soon be available with the Macintosh. These include:

■ Naru Enterprises, Inc.'s Fact Finder, which reportedly boosts information storage and retrieval productivity. It costs \$100 and will become available during the second quarter from Naru Enterprises at P.O. Box 206, Deer Harbor, Wash. 98243.

■ A recent adaptation of Desktop Software Corp.'s NPL Information Management System, a fourth-generation language that purportedly allows computing novices to develop data base management applications. The NPL Information Management System is projected to cost \$950 and to be released in April from Desktop at 228 Alexander St., Princeton, N.J. 08540.

■ Four standard accounting programs from BPI Systems, Inc. The packages will sell for \$395 each and will start finding their way into customers' hands this spring from BPI at 3423 Guadalupe, Austin, Texas 78705.

■ Haba Systems, Inc.'s Habadex product, which is said to maintain appointment calendars electronically and simplify both telephone dialing and record keeping. Habadex will cost \$195 and is to be available April 1 from Haba Systems at 15154 Stagg St., Van Nuys, Calif. 91405.

■ Think Tank, an outline-processing aid slated to cost less than \$2,000 and to be released during the second quarter from Living Videotext, Inc. at Suite 232, 1000 Elwell Court, Palo Alto, Calif. 94303.

■ CRT Plus, a decision support tool that Aurora Systems, Inc. will be selling to financial institutions for an estimated \$995, plus a \$150 annual maintenance fee, from 2423 American Lane in Madison, Wis. 53704.

■ Human Edge Software Corp.'s series of three business strategy application programs, consisting of Sales Edge, Management Edge and Negotiation Edge, each of which sells for \$295. Unlike Sales Edge, which will begin to be sold during the second quarter, the other two programs will become available in the latter half of 1984 from its developer, Haba, at 2445 Faber Place, Palo Alto, Calif. 94303.

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COMPUTER INDUSTRY

Whither STC after mainframes?

INDUSTRY INSIGHT

BILL LABERIS
CW Senior Editor

Storage Technology Corp.'s (STC) recent announcement that it has scrapped its mainframe development efforts was certainly a surprise, especially to anyone who has spoken lately with Jesse Aweida, chairman and founder.

Interviewed by *Computerworld* in mid-December, Aweida boasted that STC's mainframe would compete against the offerings of IBM with success similar to what STC experienced selling its 3350-look-alike disk drives a couple of years ago.

Now it appears that STC's mainframe efforts have been torpedoed by a number of adversities, not the least of which was the perceived inability to compete against IBM's strongest suit — mainframes.

Chip failures

The official word was that very large-scale integration chip failures caused delays that "reduced the likelihood of successfully marketing the mainframe computer." The question is, what growth path will STC choose now? And what can the company do to restore some of the credibility it lost with this — the second announcement of a major project gone sour — in the last 18 months? The company in August 1982 abandoned plans to market its Virtual Storage System, a complex back-end storage system, one year after announcing the product with great fanfare.

Right now, the mainframe disk drive market belongs to IBM, which shipped an amazing 43,000 spindles for its 3380 thin film head version in 1983, while compatible vendors like Memorex Corp. and STC watched their 3380-like machines trickle out of the loading docks. The bad news for the compatibles here is that IBM will likely announce a quad-density version of the 3380 this year, a machine capable

See STC page 88

Wang eyes overseas market Seen key to future growth

By Peter Bartolik
CW Staff

PALM SPRINGS, Calif. — "Five out of every six office workers get up, put on their clothes and go to an office that is outside of the U.S."

Additionally, 78% of the gross worldwide product is outside of the U.S.

For that reason, according to J. Carl Masi Jr., senior vice-president of international operations at Wang Laboratories, Inc., U.S. computer vendors are particularly anxious to tap the international sales market.

In a recent interview here, Masi claimed that Wang's international market is growing at a rate three times faster than its nearest competitor. But the percentage of revenues Wang realizes from foreign sales is still too low in comparison to that of other companies, he added.

Wang realizes about 35% of its total revenues from foreign sales, according to Masi, while IBM realizes about 45%. At the same conference Masi was attending here, a Prime Computer, Inc. executive said his company realized half of its total revenues from foreign sales.

When Wang reached \$1 billion in revenues in 1982, the company set a new goal of reaching \$5 billion by 1990, but is growing faster than that, according to Masi. "If the target is \$5 billion, I'd like [international sales] to be half of that," he said.

Because of the potential user base outside the U.S., Masi added, "we're under potential. It stands to reason we should be doing more."

Wang makes direct sales through 20 different subsidiaries and sells into a total of about 100 international markets, he said. Outside the U.S., approximately 7,000 people are employed by Wang, about half of them service related; about 4,000 others are involved in exclusive sales of Wang products, according to Masi.

Wang in recent years has become more involved in foreign investment, he said. At first, the company established manufacturing facilities in "tax havens" of Puerto Rico and Ireland. More recently, it has invested in foreign countries for other than tax reasons, such as for having manufacturing facilities near the markets.



Masi

U.S. companies desiring to sell successfully in foreign countries, particularly to the large public sector, must be willing to meet those countries' demands for investment. "They want to see employment and export, and they want to see technology transfer and value added," he said.

"If the country has demonstrated an instable economy or political structure and there's a high chance of nationalization, you're more likely not to put in an expensive manufacturing plant." — J. Carl Masi Jr., senior vice-president of international operations, Wang Laboratories, Inc.

In every country where Wang has established manufacturing facilities, he added, 50% or more of its supplies come from the local economy.

"By 1990, every major subsidiary we have will have its own manufacturing facility. Eighty percent to 90% of international requirements will be developed [outside the U.S.]," he said.

Such investments require a degree of caution, he said. "If the country has demonstrated an unstable economy or political structure and there's a high chance of nationalization, you're more likely not to put in an expensive manufacturing plant," he said. "You're more likely to put in a [research and development] facility."

The bottom line, he added, is what the company expects to get out of the commitment. Balancing company expectations against the internal factors of a particular country is something he does "by feel and by gut and by talking to people." Wang has no group of international policy advisors, he said.

See WANG page 88

WANG

Having scrapped plans to build its own chips, Wang buys 15% of a San Jose, Calif.-based chip maker/93

intel

Intel's output for 1984 is already spoken for, as the firm goes all out to expand capacity and make supply meet demand, its president said/95

INSIDE

■ TI and Motorola still sit atop the merchant semiconductor heap, but AMD and the Japanese are making strong market bids/90

■ Ada is DOD's chosen son, and plenty of companies are jumping on what promises to be a multi-billion-dollar bandwagon/94

AT&T's profits plunge

NEW YORK — AT&T reported that fourth-quarter profits declined 58% over year-earlier figures as a result of \$1 billion in reorganization costs and that a previously announced multibillion after-tax charge reduced profits for the year to a low \$249 million, or 13 cents per share, compared to the previous year's earnings of \$7.28 billion, or \$8.40 per share.

Charles L. Brown, chairman of AT&T, said the last financial report of a consolidated Bell system would confuse investors because of the special charges. "I therefore want to stress that, in the main, they reflect one-time, one-of-a-kind events which are a consequence of the breakup of the Bell system," he said.

Taken at face value, \$1.4 billion in reorganizational and other costs and \$5.5 billion in after-tax charges pro-

duced a fourth-quarter loss of \$4.87 billion, reportedly the largest loss ever posted by a U.S. corporation. Revenues for the fourth quarter increased over the year-earlier quarter 5.4% to \$17.6 billion and for the year increased 6.6% to \$65.1 billion.

Income for the quarter was \$623.2 million, or 62 cents per share, and reflected one-time costs resulting from an estimated \$1 billion in reorganizational costs, costs associated with last summer's strike against AT&T and \$176 million paid over to Litton Industries, Inc. as the result of an antitrust judgment.

The charge-off of \$5.5 billion resulted from equipment write-offs and accounting changes and was higher than the \$5.2 billion that AT&T had predicted last October, reportedly because final figures showed less equipment on hand and less value.

TI down \$145 million in '83

DALLAS — Losses in the home computer market and a final exit from consumer computer sales cost Texas Instruments, Inc. approximately \$660 million during fiscal year 1983, the company reported Jan. 27. Even with an extraordinary tax benefit of \$193 million, TI's operations overall produced a net loss of \$145.4 million, or \$6.09 per share.

After pulling out of the home computer business late last year [CW, Nov. 7] the company realized fourth-quarter profits of \$77.5 million, or \$3.23 per share, up 82% from year-earlier results. The fourth-quarter profits included "better than expected sales" of the TI 99/4A home computer, with bargain-basement prices that leveled off under \$49 per unit and reductions in software prices resulting in sales producing an \$11 million profit from previously written-

off inventories.

Overall, the company experienced a 6% increase in net sales to \$4.5 billion for the year. Excluding the consumer computer products, the company's operations produced a net sales increase of 10% and profit increase of 73%, company President J. Fred Bucy and Chairman Mark Shepherd noted.

The home computer bail-out and cash needs of other operations pulled TI's cash reserves and short-term investments down from the \$420 million reported one year ago to \$185 million at the end of 1983. Nevertheless, the two executives said, "We believe our current cash position and available financing sources will support TI's future growth."

The company reported accelerated capital expenditures during the

See TI page 88

COMPUTER INDUSTRY

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There's an automation revolution happening on the factory floor, and computerized manufacturing systems are leading the charge.

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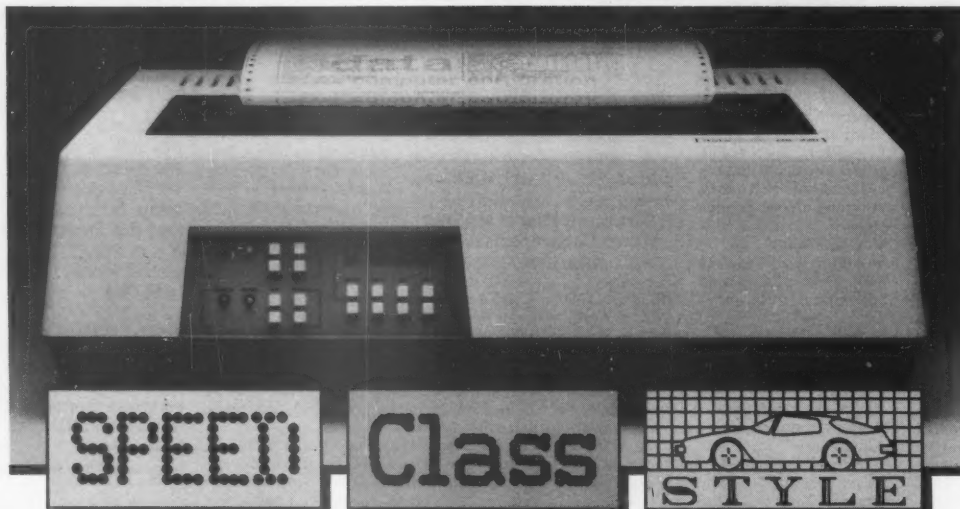
If you would like to contribute a tutorial or application story to the report, send your three- to six-page, typed, double-spaced manuscript to Bill Laberis or Pete

Bartolik, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

The deadline for all submissions is Feb. 10. Accepted articles sent with accompanying charts, black-and-white photographs or other camera-ready graphics will receive top priority.

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addressable output. Sharp new details emerge from business charts and graphs, and engineering drawings.

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WANG from page 87

"You have to be close to it. ... I travel about 50% to 60% of the time, and I talk to political leaders as well as other people," Masi said.

But daily operations require dependence on others, Masi continued. "Unless there are emergencies, it makes sense to have local managers running the country."

In international markets, Wang is in the top three or four computer vendors in most areas, No. 2 in some and No. 1 in others that are less mainframe-oriented, he said. "Around the world, the No. 1 competitor is IBM. Then after that it's Digital Equipment Corp. — it used to be Hewlett-Packard [Co.]," according to Masi.

TI from page 87

fourth quarter, reaching a 40% increase and a total of \$478 million for the year, representing major expenditures for new semiconductor processing capacity and government electronics facilities.

Semiconductor orders and shipments grew strongly throughout the year and reached record levels during the fourth quarter, TI said.

Additionally, the company said, the TI Professional Computer experienced a positive quarter-to-quarter trend during the year, and the demand for TI's Business Systems picked up in the second half of the year.

STC from page 87

of twice the 3380 storage at less than twice the 3380 price. Having long ago recovered its 3380 research and development monies, IBM will continue to dominate this market, leaving little on the table for its competitors.

STC's tape drive sales will remain healthy, but again IBM may announce an 18-track successor to its 3420, whose priced was chopped a few months back. While an IBM announcement may actually benefit STC, rumored to have its new tape drive waiting in the wings, the question is how much.

How about STC's optical storage subsystem? Until someone comes out with a functional erasable model, optical storage will remain a pipe dream, at least for the massive installed IBM mainframe customer base.

Nonetheless, STC is well poised in the optical disk market, should it ever develop.

So where will the company look to grow from here? Good question, and one which Aweida should look to answer fairly soon. STC cannot live off IBM's 3350 mistakes forever.



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CW 2/10

COMPUTER INDUSTRY

TI, Motorola pace merchant semi world: ICE

By Robert Batt
CW West Coast Bureau

SCOTTSDALE, Ariz. — Texas Instruments, Inc. and Motorola, Inc. remain the top two merchant semiconductor manufacturers worldwide, with Advanced Micro Devices, Inc. (AMD) and Toshiba Ltd. making major gains, according to a recently released report by Integrated Circuit Engineering Corp. (ICE).

The ICE report, "Status 1984 — A Report on the Integrated Circuit Industry," said TI remains the top merchant integrated circuit supplier, with sales estimated at \$1.45 billion, out of total semiconductor revenues

of \$1.55 billion.

Motorola's semiconductor revenues also reached \$1.55 billion, with sales of integrated circuits topping the billion-dollar mark for the first time, totaling \$1.04 billion. These figures, the market research firm added, reflect increases of almost 30% for both companies during 1983.

Merchant semiconductor sales refer to chips made by manufacturers that are sold to system houses, as opposed to chips used for internal consumption. In terms of pure volume, IBM is the world's leading semiconductor manufacturer, but it consumes virtually all of the semicon-

ductors that it produces.

According to ICE, Motorola remains the top merchant supplier of discrete semiconductors, those individual transistors capable of performing only one function, with 1983 shipments estimated at \$510 million, an increase of 21% over the previous year.

TI, on the other hand, continues its exodus from the discrete market, with sales in that area down by almost 40% from 1982 levels of around \$160 million, the report added.

Among the second tier of integrated circuit manufacturers, ICE claimed, AMD has climbed to No. 9 in

the industry, passing both Fairchild Camera and Instrument Corp. and N.V. Philips, the Dutch manufacturer, for that spot.

Japanese suppliers also continue to show vigor, with Toshiba Ltd. passing National Semiconductor Corp. for the No. 5 position.

NEC Information Systems, Inc. remains the leading Japanese integrated circuit producer, ranking third in the top 10.

"The top two American producers managed to stave off the challenge from NEC for the No. 2 spot largely because the U.S. economic recovery led that of Japan, and the unprecedented demand for bipolar devices favored the American suppliers," said William Strauss, ICE vice-president. Strauss explained that bipolar devices constitute a smaller share of integrated circuit production in Japan than they do in the U.S.

Worldwide production

Worldwide semiconductor production for 1983 is estimated by ICE at \$21.4 billion, (including nonmerchant, or captive, suppliers such as IBM and Hewlett-Packard Co.), a 20% rise over 1982.

Integrated circuits accounted for \$16.6 billion of that figure, Strauss said, with U.S. merchant integrated circuit production pegged at \$7.8 billion, a 26% increase over the previous year.

Basing its calculations on a poll of major manufacturers, ICE estimated a 20% jump in merchant integrated circuit production for 1984.

Although U.S. integrated circuit plant capacity increased 15% during 1983, ICE claimed utilization rose only 3.5%, thereby contributing to increased backlogs and delivery lead times.

According to the report, some moderate relief is in sight, with capacity forecast to increase 12% in 1984 and plant utilization expected to rise 8.3%.

The report estimates Japanese integrated circuit production during 1983 at \$4 billion, a 31% jump over 1982, and ICE forecasts only slightly less growth this year, with shipments predicted to be up by 28%. Japanese semiconductor capital spending, the report added, continues to grow at a rate over twice that of the U.S., up 47% in 1983, vs. 20% for U.S. companies.

Europe behind

European integrated circuit production, the report continued, has lagged behind that of the U.S. and Japan, with 1983 sales of \$965 million, up 16% over 1982.

However, the report foresees a 22% increase this year. "For the first time, European [integrated circuit] production has passed discrete semiconductor production," Strauss noted.

Among the nonmerchant semiconductor houses, IBM continues to lead the pack, with an estimated 1983 production value of \$2.4 billion. Western Electric Corp. was a distant second, with a production value of \$390 million.

The 152-page report is priced at \$195.

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COMPUTER INDUSTRY

NICKELS & DINES

Lee Data Corp. has announced third-quarter revenues of \$26.4 million, a 70% increase over the same period last year. Net income for the quarter was \$4.6 million, up from \$3.3 million a year ago. Revenues for the first nine months were \$67.6 million and earnings were \$12.3 million, up 88% and 68%, respectively.

Bolt, Beranek & Newman, Inc. has reported net income for the second quarter ended Dec. 31 of \$1.3 million, or 17 cents per share, compared with \$757,000, or 11 cents per share, for the second quarter of 1983. Sales were \$25.2 million, up 21% over the same period last year.

NBI, Inc. has reported a 24% increase in revenues, but a 13% decrease in earnings, for the second quarter ended Dec. 31. Revenues were \$44.7 million, compared with \$36.1 million for last year, while income was \$3.3 million, or 33 cents per share, compared with \$3.8 million, or 38 cents per share last year.

Harris Corp. has reported sales of \$472 million and net income of \$18.6 million, or 46 cents per share, for its second quarter ended Dec. 30, compared with sales of \$434 million and a profit of \$15.6 million, or 40 cents per share, for the comparable period in 1982.

Gould, Inc. has reported



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net earnings for fourth-quarter 1983 of \$25.2 million, or 56 cents per share, compared with \$20.3 million, or 46 cents per share, for the same period last year. Sales for the period totaled \$342.3 million, a 10% increase over fourth-quarter 1982. Net earnings for the year declined slightly from \$79.9 million in 1982 to \$79.2 million in 1983. Discontinued operations produced a loss of \$15.1 million, or 33 cents per share, against the

\$12.9 million, or 30 cents per share, earned in 1982.

Ungermann-Bass, Inc. has reported revenues for the year ended Dec. 31 of \$25.4 million, up 125% from 1982. Net income was \$1.9 million, or 14 cents per share, compared with \$308,000, or 2 cents per share, in the prior year.

Micom Systems, Inc. has reported sales for the third

quarter ended Dec. 31 of \$34.3 million, up 62% over the same period last year. Earnings increased 63% to \$5.5 million, or 35 cents per share.

Computer Consoles, Inc. has reported a 31% increase in revenues and a 40% increase in net income for fiscal 1983. Revenues hit \$103.6 million, and net income rose to \$10.4 million, or 87 cents per share, compared

with \$7.4 million, or 66 cents per share, for 1982.

Stratus Computer, Inc. reported annual sales in 1983 of \$20.6 million, compared with \$5.5 million the previous year, while profit for the period jumped to \$2.2 million, or 13 cents per share, from 1982's net loss of \$1.2 million, or 30 cents per share. Sales in the fourth and final quarter totaled \$6.7 million, with earnings of \$1 million.

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COMPUTER INDUSTRY

SUPERSHORTS

Andrus has been named president of the division.

■ **Digital Equipment Corp.** has unveiled a program designed to assist universities integrate personal computers into nontraditional disciplines. With \$16 million worth of DEC hardware, Partners for the Advancement of Computers in Education will aim to foster development of instructional methods and software while

increasing student and faculty productivity, DEC said. Fifteen universities have been selected to participate.

■ **Honeywell Information Systems and Textronix, Inc.** have signed a cooperative marketing agreement under which Textronix will receive assistance from Honeywell in marketing its computer display terminals, copiers and plotters to Honeywell customers in the U.S. Textronix

will be responsible for marketing and maintaining the products, which will support Honeywell's entire computer line.

■ **General Electric Information Services Co.** has become an IBM value-added dealer for the IBM Personal Computer.

■ **Xerox Corp. and Advanced Computer Communications (ACC)** will both mar-

ket ACC communications software products, which enable Xerox systems products to operate compatibly with Digital Equipment Corp.'s VAX and PDP-11-based systems which use the VMS, RSX-11 and Unix operating systems.

■ **AT&T Information Systems** has signed a contract with American Express Co. to design, build, install and maintain an integrated voice and data information system which will serve American Express' new headquarters in New York. The value of the agreement during the first five years is in excess of \$20 million.

■ **National Semiconductor Corp.'s subsidiary National Advanced Systems (NAS)** will provide hardware maintenance nationwide to Magnuson M80 series customers of Phoenix Leasing, Inc., a wholly owned subsidiary of Phoenix American. Under the agreement, Phoenix Leasing will provide logistical support and Magnuson parts to NAS. NAS will offer Phoenix customers the option of contracting for the NAS total support package, which includes a complete range of services for the IBM or IBM-compatible data processing center.

■ **Perkin-Elmer Corp.** has formed a third-party ventures group under the direction of Richard E. Dural within its Data Systems Group. According to Dural, "The charter of the newly formed organization is to complement the Perkin-Elmer superminicomputer and desktop workstation line with products supplied by software houses and independent hardware manufacturers for the commercial and scientific markets."

Wang buys 15% of VLSI

LOWELL, Mass. — Wang Laboratories, Inc. recently announced the purchase of 15% or 2.8 million shares of VLSI Technology, Inc. for \$34 million.

The two companies recently signed a technical support and cooperation agreement whereby VLSI will provide Wang with access both to its software design technology and to its integrated circuit wafer-processing capacity.

Based in San Jose, Calif., VLSI develops and markets a series of software products and services for the design of custom and semicustom very large-scale integrated circuits and also designs, manufactures and markets custom and semicustom integrated circuits.

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COMPUTER INDUSTRY

DOD push of Ada spawns business bonanza

OUTSIDE LINES

BOHDAN O. SZUPROWICZ

In the early 1970s, the Department of Defense (DOD) began to develop a uniform, all-purpose computer programming language in an attempt to simplify the use of a variety of computing hardware and to control its skyrocketing software costs, currently running over \$10 billion a year.

The result is one of the most advanced computer programming languages, Ada, on whose development DOD has already spent about \$20 million. Initial Ada compilers and software development tools are now being validated by DOD, and 1984 will probably see the emergence of a new industry dedicated to the development of Ada applications software.

Proponents of Ada see it as an advancement in the art of programming, because the new language allows use of application programs on any computer model, making programmers independent of computer hardware. Ada language is supported by IBM and Intel Corp., which gives it a lot of credibility.

On the other hand, because it is so comprehensive, it is not among the most user-friendly computer lan-

Since DOD is the largest software consumer in the world, its preference for Ada is being closely watched by software companies who see a new business bonanza in Pentagon programs such as these. Some even believe that Ada will affect more software professionals during the 1980s than Cobol did in the 1960s and 1970s. Others are rushing to set up specialized shops developing Ada . . . in anticipation of a market takeoff in 1986 which is expected to reach \$1 billion well before 1990.

guages. Its critics believe it will never become widely used by the programming community. But if Ada is to save billions for DOD, the reluctance of present software suppliers who stand to lose lucrative contracts is expected.

DOD itself expects to save \$24 billion by the year 2000 from use of Ada. Through its directives, DOD is also in a position to make Ada mandatory in development of embedded computer systems, whose software is expected to cost \$4 billion in 1984 alone.

Latest forecasts suggest that expenditures on embedded computer systems in modern weapons platforms will increase even faster than

previously reported and may reach \$30 billion by 1990.

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Some forecasts even suggest that commercial use could demand as much as \$100 billion worth of Ada software during the 1990s.

About two dozen small companies have already decided to place their bets on the Ada sweepstakes, developing compilers and workstations for use by the Ada programmers of tomorrow. Some are indistinguishable from run-of-the-mill software start-ups, but a few appear to be catching the eye of the venture capitalists and investment bankers who understand what is at stake.

Intellimac Corp. claims to be the first company to produce commercial

Ada applications software and is already planning to raise \$14 million through its first public offering, now being readied. The company is a minicomputer systems integrator and needs the capital to produce a microcomputer for Ada multiprocessing applications.

Computer Thought, Inc. is a 1981 start-up that combines the techniques of artificial intelligence with specialized hardware to develop a workstation for learning Ada programming. The company received two rounds of financing from leading venture capital firms. The array of smart money investors it has attracted suggests that the company's thoughts about Ada may be on the right track indeed.

Telesoft, Inc., a 1981 start-up, was among the original Ada compiler developers and has already sold over 350 units to commercial and military customers. The company is developing Ada compilers and microcomputers using the Unix operating system and has an Ada compiler for the IBM Personal Computer.

Intermetrics Corp. and Softech, Inc. are two Ada pioneers that developed compilers for the U.S. Air Force and U.S. Army, respectively. Both have grown in sales to over \$30 million each. Softech is hedging its bets by developing operating systems for microcomputers that are portable from one popular machine to another.

But perhaps the most intriguing of new Ada ventures is Alysia Microsystems Corp., a subsidiary of a three-year-old French company headed by Jean Ichbiah, one of the leading Ada designers and an original developer. The U.S. subsidiary is marketing low-cost Ada compilers for microcomputers and has a training system for the IBM Personal Computer. Its ambition is to become the leading Ada micro software supplier.

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Martin Marietta division grabs \$102 million Labor contract

WASHINGTON, D.C. — The U.S. Department of Labor has awarded Martin Marietta Data Systems, Inc., a division of Martin Marietta Corp., a \$102 million contract to design, install and maintain a computerized information system for the department's Division of Federal Employees' Compensation.

The contract, to be spread over eight years, involves designing an application system to handle claims examination, financial management, rehabilitation, medical support, case maintenance, district office support and national office support for the more than 2.8 million federal employees covered by the federal compensation program.

Martin Marietta Data Systems will install IBM 4300 series mainframes to provide automation in the division's national office and in district offices across the country. The company will also train federal employees to operate the system, handle all data conversion from the current system to the new system and main-

tain the facilities for eight years.

Martin Marietta Data Systems has proceeded along a rapid growth path for several quarters now, exercising the financial muscle of its parent to purchase Mathematica, Inc. for \$30 million last August [CW, Aug. 8, 1983]. The company's strategy remains to make applications and system software independent from the hardware, while targeting the low-end mainframe and superminicomputer offerings of IBM, Digital Equipment Corp. and Hewlett-Packard Co.



COMPUTER INDUSTRY

Output for '84 already spoken for: Intel chief

By David Myers
C/W New York Bureau

NEW YORK — With 23 new buildings under construction, Intel Corp. is adding production capacity as quickly as it can and will catch up with its backlog of semiconductor orders "at the next recession," according to company President Andrew S. Grove.

Addressing a meeting of stock analysts here late last month, Grove said Intel's entire 1984 production volume of memory chips and microprocessors is already spoken for. New orders will not be filled before next year, he added.

"We're going to catch up at the next recession. We'll be in a precise balance of supply and demand for about 35 seconds," Grove quipped.

Grove said the semi maker's revenue growth was limited by its ability to catch up with the backlog of orders. Even so, in 1983 the Santa Clara, Calif.-based company earned \$116 million, almost quadruple its \$30 million profit in 1982.

Grove said Intel officers expected "a pretty good year" in 1984. He declined to be more precise, beyond saying that the company expected to contribute "several tens of millions" to its employee profit-sharing fund, while last year it contributed only around \$1 million.

The chip maker's rebound from two years of lagging profits was charged by fast sales of its 8086 microprocessor, which had grabbed a 72.3% share of the 16-bit microcomputer market by year's end, according to Grove.

Pointing to a chart that showed a steep growth curve for the 8086 since its introduction in 1982, Grove said, "If we could meet actual demand for the product, that line would be vertical."

The Silicon Valley firm had introduced the 8086 and added wafer fabrication capacity during the recession in order to be ready for any upturn in the U.S. economy. "But we

did not anticipate the strength of this recovery sufficiently," Grove said.

In his first speech in two years before Wall Street analysts, Grove said Intel was attempting to standardize microprocessors for the computer industry "so that we can move forward without requiring further software development." He also said that Intel would be graduating to 6-in. wafer fabrication from 4-in. wafers. Grove



Grove

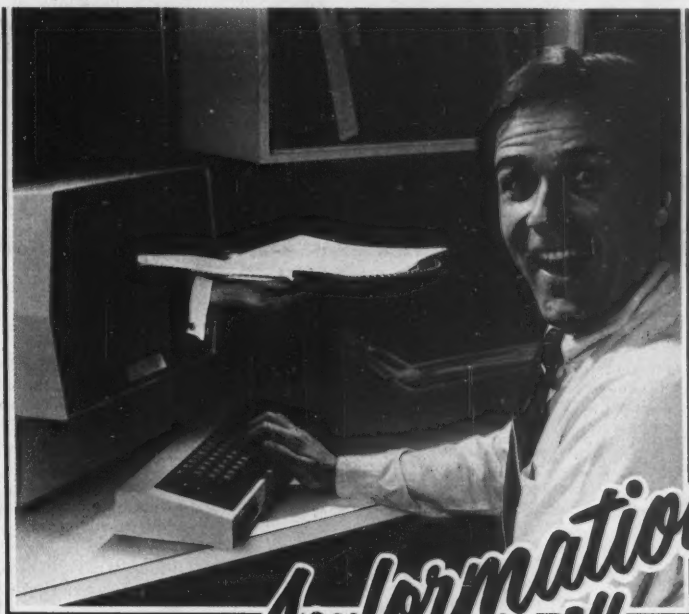
said 2,200 chips could be carved out of a 6-in. wafer, as opposed to 400 from a 4-in. slice of silicon.

"But we won't see the benefits of this for a long time," Grove cautioned, saying he shared it as "an indication of the type of thing we are doing beyond adding brick and mortar" — building new plants, that is.

In addition, Grove revealed that Intel is negotiating second-source licensing pacts with two different semiconductor makers in order to increase the market supply of 8086-type microprocessors. And the company is looking to work out deals to

rent still other manufacturers' wafer-fabrication facilities in order to free Intel production room for 8086 manufacture, he said.

Despite a recent push of its single-board computer systems business, Grove vowed that Intel would never become "a systems-dominated company." And despite a clear lead for U.S. semiconductor makers over their Japanese rivals, Grove said, "It is important for us in this industry not to be lulled by this. I can't picture a roomful of Japanese execs saying, 'We lost this one, gentlemen. Let's go back to making motorcycles.'"



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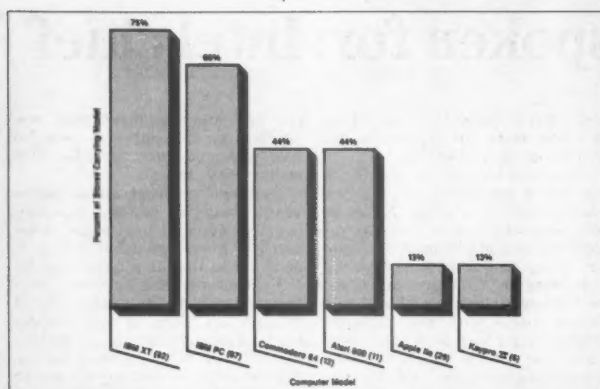
TUSTIN, Calif. — The American Microcomputer Dealers Association (Amda) has been formed in response to a survey that indicated "a void exists in an industry that is rich in hardware technology and software development, but poor in the area of serving computer dealers directly."

Amda said it will provide services in areas of interest to resellers. Members have access to a range of financial and marketing tools through Amda/Net, a subsystem of the GTE Telenet Communications Corp. Mail-net network. Depot and on-site maintenance programs are available also through an Amda service provider.

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Amda membership costs \$195 per year from Amda at Suite 200, 17842 Irvine Blvd., Tustin, Calif. 92680.

COMPUTER INDUSTRY



Most frequently mentioned vendors with slow delivery problems.

Source: Infocorp

Apple holds lead; IBM closes micro gap: study

CUPERTINO, Calif. — Apple Computer, Inc. has maintained and even increased its lead in terms of volume share of personal computer sales in retail stores.

But IBM, too, has increased its share of retail sales and has done so at a faster rate than has Apple or any other personal computer competitor.

These were some of the conclusions reached in a recent study of computer store sales for the third quarter of 1983 by Infocorp, which polled 322 retail outlets in its survey.

Infocorp's data established that Apple's share of retail store sales vol-

ume of microcomputers rose to 44.5% from 42.4%, despite prior predictions that the company would suffer a devastating loss in share during the third quarter. IBM's share rose to 35% from 30%, giving Apple and IBM nearly three-quarters of the retail store market share for personal computers.

At the same time, other data indicated IBM has surpassed Apple in total share of the personal computer market. Apple relies on the retail store channel almost exclusively to sell its machines, while a significant portion of IBM's micro sales are made by its direct marketing force, Infocorp said.

In addition, the survey discovered that the hottest microcomputer system in the retail chain is IBM's Personal Computer XT, with 72% of the dealers who carried both the Personal Computer XT and Apple's Lisa reporting greater customer interest in the IBM model. "This seems to further attest to the significant inroads IBM has made in the retail store channel," Infocorp noted.

The demand for IBM's micro products, however, has not been matched by adequate deliveries from the company, the survey continued. "The situation remained acute for the [Personal Computer] XT, but was alleviated somewhat... for the [Personal Computer] Apple's IIe delivery improved significantly," the survey found.

Other major survey findings included:

- Microcomputers from Digital Equipment Corp., especially the Professional, and from Osborne Computer Corp. were the most overstocked machines in the dealers' inventories. Further, in a survey category dubbed "Sales vs. Expectations," DEC's machines did "relatively poorly."

- The reliability of Commodore Business Machine, Inc.'s Model 64 worsened in the period surveyed, while poor reliability reports increased "dramatically" for Kaypro, Inc.'s II and 4 models.

- Both Commodore and Osborne were rated "poor" in terms of product support.

- While the Apple IIe was rated as the machine easiest to sell to the home and school markets, IBM dominated the small, medium and large business markets, as well as professional applications.

- Apple and IBM dominated retail store sales to the government sector. Infocorp, 20395 Pacifica Drive, Cupertino, Calif. 95014.

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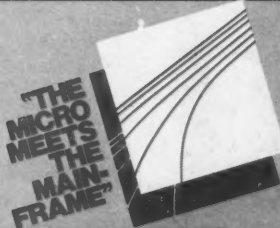
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7. Rolling Meadows, IL

8. Novi, MI
9. Dallas, TX
10. Houston, TX
11. Atlanta, GA
12. Raleigh, NC
13. Orlando, FL
14. Lexington, MA

15. Paramus, NJ
16. Valley Forge, PA
17. Rockville, MD
and other cities across the U.S.

Besides degree or equivalent, 2 years' successful CAE/CAD/CAM or manufacturing minicomputer sales experience is desirable.

Commercial/Business Computer Sales

These positions are responsible for selling large-scale minicomputers, primarily to the manufacturing market. As well as managing the existing customer base in your assigned territory. Besides degree or equivalent, 2 years' successful business computer sales experience is desirable.

Invest in your future... long term.

We rank high among major computer companies in terms of sales growth, earnings, product innovations and employee retention. This means career stability... year in and year out. It starts with in-depth training for up to 10 months, covering every aspect of the business... from learning the HP product line to the most sophisticated sales techniques.

You'll quickly gain hands-on experience working with senior HP people.

With HP you'll reap the benefit of rapid production, delivery and installation, plus strong pre-and post-sale technical support. Because our credo is "productivity - not promises."

Consider the HP advantages.

Besides excellent compensation and benefits, you'll find your career progression with us a lot smoother than what you've experienced in the past. For immediate consideration, please send your resume with salary history, indicating your preferred city.



An Equal Opportunity/Affirmative Action Employer
No Agencies Please

DATA PROCESSING

SYSTEMS PROGRAMMER (PRIME)

We are seeking an innovative, creative individual with 1-4 years quality technical experience supporting PRIME SYSTEMS, preferably 750, 850 and/or 9950. Experience with PRIMOS, MIDAS+, PRIMENET and other relevant software is required. This position involves total responsibility for PRIME software including software evaluations, recommendations, and support. Opportunities exist for growth and development in an IBM environment. The candidate we are seeking will join a staff of 4 systems programmers currently supporting 2 4341G2 with VM/SP, DOS/VSE, CICS and DBMS.

We offer a 5% employment bonus, competitive salary, benefits and excellent growth opportunities. For immediate consideration, please send your resume or phone:

Randel Sanders
TIME INSURANCE COMPANY
515 West Wells
Milwaukee, WI 53203
Telephone: (414) 271-3011
Equal Opportunity Employer M/F



PROGRAMMERS AND ANALYSTS

Growing software services company involved in implementing several HOGAN systems at leading California financial organizations is searching for Hogan expertise. You will be assigned to one of our Fortune 500 financial clients and be an integral part of their Hogan implementation process. We offer high salaries, bonuses, fringe benefits and relocation. Send resume or call collect at (213) 380-2681.



Commercial Programming Systems Inc.
3400 West 8th Street, #209
Los Angeles, California 90020

NEW ENGLAND'S FINEST

Opportunities are abounding — We can find you the finest positions available in New England or most any place of your choosing. We have the finest client base of High Tech, Manufacturing, Insurance, Banking and Service Companies with state-of-the-art environments. Positions at every level. Minimum one year experience.

Software Development to 52K
DBA/Data Analyst to 50K
Project Leader to 45K
Systems Programmer to 42K
Systems Analyst to 40K
Programmer Analyst to 38K

Send resume in confidence or call Mitch Price or Linda Kalajian toll free (800) 628-3374 or in Massachusetts call (collect) (413) 781-0982.



dps Specialists

DYNAMIC PERSONNEL SYSTEM
P.O. Box 539
West Springfield, MA 01090

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JOIN A TEAM ON THE LEADING EDGE OF TECHNOLOGY!

Computer Consoles, Inc. designs, manufactures, installs and services a variety of minicomputer-based fault-tolerant information systems. Located in Rochester, New York, we have all the cultural and educational advantages of a large metropolitan area as well as the ambience and scenic beauty of a small, relaxed town.

CCI currently has opportunities for:

GROUP LEADER/SOFTWARE ENGINEERS

You will be responsible for the design and implementation of data base applications and utilities or fault-tolerant operation system development, including developments of a multi-processor UNIX-compatible transaction processing system. We prefer a technical degree plus a minimum of 2 years' experience. Knowledge of "C", UNIX and data structures and experience with data bases in minicomputer Real Time or on-line environment and/or OS internals are pluses.

DATA MANAGEMENT SYSTEMS DESIGNER

You will be a member of a team responsible for designing and developing an interactive transaction data management system. This includes an integrated data dictionary, query editor and advanced files access method. A non-procedural commercial application generator and forms manager provide easy-to-use facilities for end-users. The total system is integrated into PERPOS_{TM}, CCI's multi-processor Power 5_{MI} family of systems and office automation products. We prefer a B.S./M.S. in C.S./E.E. plus 4-5 years' experience in system design and development of data management systems. Experience with UNIX and "C" is highly desirable.

SENIOR SYSTEM SPECIALIST

You will be the lead designer and developer of advanced R&D projects that will extend CCI's Power Series of fault-tolerant systems. An advanced degree with extensive experience in UNIX operating system development are required. Additional experience with other operating systems and hardware system design is highly desirable.

*UNIX is a trademark of Bell Labs

We offer challenging assignments, opportunities for growth, attractive compensation, and a benefits package that includes dental and profit sharing plans. Please send your confidential resume, including salary history and indicating position of interest, to:



S.C. Hoskins
Computer Consoles, Inc.
97 Humboldt Street
Rochester, New York 14609
Equal Opportunity Employer M/F/H/V

We need DATA PROCESSING PROFESSIONALS to upgrade our '84/'85 systems

(CONSIDER THE POSSIBILITIES)

American Isuzu Motors, an automotive importer/distributor was founded in 1980. Since then we have grown rapidly and are currently seeking experienced data processing professionals in the areas listed below:

LEAD SYSTEM ANALYST

We need an experienced System Analyst with a background in project management. The successful candidate will have a B.A. degree or equivalent and 2-4 years previous experience as a lead system analyst. Two years supervisory experience required with business knowledge of automotive industry desirable. Good written and verbal communication skills are necessary. The primary responsibility is to compile business requirements for computer system design which includes operation survey, data base and general system design, and preparation of documents for users and programmers.

SYSTEM PROGRAMMER

We seek an individual who is qualified to design, program and maintain computer software. This position requires a B.A. degree, five years system programmer experience and three years IBM DOS and IBM VTAM experience. Responsibilities include reviewing and analyzing software supplied by the manufacturer and determine optimum configuration required for the installation.

We plan to upgrade our system in '84 and '85 corresponding with the growth of our company. We offer excellent company paid benefits including all group insurance.

Send resume with salary history to:

American Isuzu Motors Inc.

P.O. Box 2280
City of Industry, CA 91746
Attn: Personnel Dept.

Principals Only
NO TELEPHONE CALLS PLEASE

Equal Opportunity Employer M/F



DIRECTOR, ADMINISTRATIVE COMPUTING CENTER NORTHERN ILLINOIS UNIVERSITY

Duties and Responsibilities: Manage the design, development, production and maintenance of administrative data processing and management information systems. Supervise a staff of 34 including 29 professionals. Report to the Executive Director of Computing Facilities.

Qualifications: Minimum of a Bachelor's Degree with a Master's degree preferred. Knowledge of an administrative computing environment is required. The ability to relate to and work closely with management personnel is essential. Technical computing expertise and management experience are essential. Must have demonstrated verbal, written and interpersonal skills. Preferably not less than three years management experience managing large project implementation on a multi-branch system in a database, on-line transaction environment. University experience is desirable.

Facilities: NIU is a university of 25,000 students located 65 miles west of downtown Chicago in the city of DeKalb. The university runs an Amdek 470 VLSI mainframe system with 12 megabytes of main memory running under MVS. On-line systems run under CICS and the ADABAS database system is used for many administrative applications.

Specifica: This is a 12-month position. Salary range - high thirties to low forties, depending on experience and qualifications. Position available May 1, 1984. Application deadline March 16, 1984. To apply please send a resume and a list of three references to:

Search Committee,
Director Administrative Computing
Executive Director of Computing Facilities
Northern Illinois University
120 Swan Parson Hall
DeKalb, Illinois 60115
equal opportunity, affirmative action,
Title IX and Section 504

UNIVAC

Programmers, Systems Analysts, Data Base Analysts, Systems Programmers—let us update you on the rapidly changing UNIVAC market coast-to-coast. To confidentially explore exciting new career opportunities, rush a resume or call Gary Repetto, CPC.

DUNHILL OF
ALBUQUERQUE, INC.
1717 Louisiana NE, Dept. C
Albuquerque, NM 87110
(505) 252-1871
Exclusively Employed Resistant

THE SCHUMANN CONSULTING GROUP

We are a respected consulting group with approximately 250 employees. For the past 12 years, we have been providing a wide variety of services in the fields of management, organization and data processing on behalf of important clients at home and abroad. Within the field of EDP, especially concerning system consulting, we belong to the leading companies in Europe. We are now considerably expanding our "System Consulting" section and are therefore looking for several new members of staff.

We require:

System Specialists for interesting and demanding system-related assignments, both German and international, using IBM equipment (Reference: 103).

You should have the following qualifications:

- sound theoretical training with degree or equivalent in mathematics, computer science or engineering
- wide experience in system programming and generation
- practical experience in installation and management of DB/DC systems
- detailed knowledge and several years' experience in one of the following fields:
 - Networks, especially SNA
 - MVS system programming and tuning with emphasis on VTAM
 - VM/CMS system programming and tuning with a DOS/VSE and MVS background
 - DDP, especially 8100
 - Data communications, especially CICS
- good knowledge of English and at least basic German

Successful candidates will not only have the necessary professional experience, but also the ability to apply their particular experience as skilled consultants. They will also need flexibility, willingness to undergo further training at all times, with our support, as well as the drive and ability to work as part of a team.

For the right candidates, we are offering competitive salaries and results-oriented bonuses. Please write to us, quoting the above reference, and enclosing all relevant credentials. For further information by telephone, ask for Mr. Tuschter. Tel.: Cologne 798091(95).

All applications will be treated with complete confidentiality.



AG, Raderberger Straße 182
5000 Köln 51, W. Germany

TULANE UNIVERSITY

ASSOCIATE PROVOST FOR COMPUTING

Tulane University has a major commitment to its position as a research and teaching center and is seeking an Associate Provost for Computing to provide leadership to the institutional commitment. Primary responsibilities are planning, review and evaluation of computing needs and resources, establishment of management guidelines for computing services, formation of the budget, oversight of communication between user groups and the Computer Center, facilitation of computing growth and active leadership of the University's effort to stay abreast of and capitalize on advancing information technology.

Tulane computing is presently comprised of two distinct user groups: academic and administrative. The administrative units include Admissions, Registrar, Financial Aid, Student Services, Personnel, Payroll, Development, Financial Accounting, and Institutional Research. Academic computing responsibilities involve (1) user needs assessment for both faculty and students, (2) expansion of user services, and (3) planning for personal computer networking, software development, and equipment purchased. Users include faculty in all disciplines who require computing resources for independent and sponsored research and for teaching purposes.

The individual must have the technical skills which will allow for effective assessment and planning for computing needs of the University community. Managerial effectiveness will be used as an important criterion in candidate selection.

Salary Qualifications

Negotiable depending on background and experience. Master's degree or its equivalent.

1. Experience in planning and developing computer systems.
2. Experience in developing user-oriented relations between computing staff and the user communities.
3. Technical and administrative experience related to the management of a computer center.
4. Extensive knowledge of information systems used for administrative and academic computing.

Application Procedure

Applicants should submit a resume, cover letter, and names, addresses and phone numbers of five references able to speak about the applicant's professional abilities. The deadline for applications is March 15, 1984. Send materials to: Francis L. Lawrence, Academic Vice President and Provost, Tulane University, New Orleans, LA 70118.

Tulane University is an Affirmative Action/Equal Opportunity Employer.

CHAIRMAN - COMPUTER AND INFORMATION SCIENCE FORDHAM UNIVERSITY

Fordham invites applicants with proven achievements in research and teaching to apply for the Chairmanship of the newly established department. The position will carry senior rank. Salary is negotiable. The new Chairman will be expected to establish a major in Fordham College. Consequently leadership in the field is essential. The curriculum, the faculty and ultimately a research program appropriate for computer and information science in a liberal arts environment. Fordham University has consistently attracted an exceptionally talented student body with a wide variety of backgrounds. They await to be challenged by the Chairman. Send VITA and the names and addresses of at least three references to:

Philip G. Charney, Search Committee
Chairman, Computer Services,
Fordham University,
Bronx, New York 10468.

Nominations and applications will be accepted until the position is filled. Fordham University is an Equal Opportunity Employer/Affirmative Action Institution.



Romac & Associates/Personnel Consultants (Agency) specializes in the placement of Data Processing, Accounting, Banking and Financial Personnel. All fees are paid by our client companies. Below are representative opportunities. Qualified candidates are invited to call or write for appointment. NO RESUME NEEDED. Replies held in confidence.

SOFTWARE ENGINEER

\$42,000

1221 MARINE MIDLAND PLAZA
ROCHESTER, NEW YORK 14604
716-232-4610

POSITION ANNOUNCEMENTS

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ROBERT HALF

SEATTLE

EXEC 8 SYSTEMS PROGRAMMER

Seeking individual with 2+ years internal, systems and software problem diagnosis experience on Sperry Univac 1100 under EXEC 8. Telecommunication and networking experience desirable. To mid \$30's

SOFTWARE ENGINEER

Seeking individual with 2-3 years software programming experience with IBM OS MVS. Mid \$30's

DATA BASE ANALYST

Headquarters of national firm seeks individual with 3+ years data processing experience in IBM OS environment, including 2+ years DB/1 and COBOL to join data base group. Will assist in all areas of data base planning, design, testing, and implementation. Position provides excellent opportunity for learning and career growth in the data base area. Salary DOE

ALASKA

FORTRAN P/A

Anchorage firm seeks scientific programmer/analyst with 1 to 4 years experience programming in FORTRAN on DEC or CDC equipment. Must have solid knowledge of analysis, design and implementation techniques. \$32-42,000

COBOL P/A

National firm seeks individual with 2-4 years experience programming in COBOL on IBM MVS with JES II, VSAM, and CICS. Position involves 70% new system development and 30% maintenance. \$30-640,000

Marjorie Peterson

ROBERT HALF of Seattle, Inc.
600 University St., #2328
Seattle, WA 98101
(206) 624-9000

NEW YORK

SOFTWARE PROJECT MANAGER IBM/Digital

If you desire challenge, with in a fast track organization, then this situation is ideal. Our client, a multi-million dollar transportation corp., has an immediate need for a Software Project Manager. All candidates must have experience in IBM and/or Digital and prior project management experience. Development and modification of software packages, understanding of data base concepts, financial applications and a minimum of 5 years programming BASIC and/or ASSEMBLER is essential. Growth situation with high visibility. Fee Paid. \$50,000

DATA PROCESSING MANAGER IBM OS/VSE FORTUNE 500

Prestigious manufacturer of consumer products has opportunity for Data Processing Manager with knowledge of IBM 4341, under OS/VSE. Candidate should be user oriented with manufacturing background. High energy and dedicated individual needed. Fee Paid. \$40,000

ROBERT HALF of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-8500

ALBUQUERQUE

PROJECT LEADER PROCESS CONTROL

Responsible for design and development of hardware and software for process control. Must have process control exp. Fortran/Assembler exp and Q clearance. Salary \$50-60,000

Dick Starnes
ROBERT HALF of New Mexico
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

MINNESOTA

ST. PAUL

BIG 8 MINI/MICROS

Mpls-area firm beefing up staff of consultants and senior consultants in response to increasing demand by small and medium-sized co's. Experience in design of systems of all sizes and Bachelor's degree required. Salary Mid \$20's to Mid \$30's

Mark David
John Miller
ROBERT HALF of Minnesota, Inc.
3636 IDS Center
Minneapolis, MN 55402
(612) 339-9001

ST. LOUIS

DATA PROCESSING MANAGER

Due to promotion the top spot in an IBM DOS/VSE shop is now available. Requires BS degree and 4-5 years as Project Leader or DP Manager. Also must have manufacturing applications experience. Salary \$38,000

DEC FORTRAN ANALYST/PROGRAMMER

Major development project needs experienced DEC VAX Fortran programmer to work on large research effort. Must have BS degree. Any exposure to DEC systems software is a definite plus. Salary \$30-45,000

RPQH PROGRAMMER/MGR

Southern Missouri manufacturer seeks individual with 2 years experience who will program in RPQH and manage the DP department. Will work on development in a S/34 environment. Salary To \$27,000

Randy Pace or
Warner Coffman
ROBERT HALF of St. Louis
7733 Forsyth Blvd.
St. Louis, MO 63105
(314) 727-1335

TENNESSEE

MIS DIRECTOR

\$100MM Division of \$3 Billion Conglomerate is looking for someone with mature managerial skills. Degree required with MBA desired. Must have 10-15 years fast-track experience including systems planning and development, data base concepts, RDP operations and integrated office systems. Excellent communication skills, tact, and diplomacy needed in dealing with upper management. Highly visible position!

ROBERT HALF of Nashville, Inc.
1101 Kermit Drive, Suite 407
Nashville, TN 37217
(615) 361-4900

SOUTHERN CALIFORNIA

PROGRAMMER/ANALYST DEC VAX/IBM/OS

Major financial institution offers career opportunity for intermediate PROG/ANAL with financial (bank or S&L) background. To \$35,000

ROBERT HALF of L.A.
3600 Wilshire, #2000
Los Angeles, CA 90010
(213) 388-8805

MIAMI

SR PROGRAMMER

Progressive organization seeking degreed individual experienced in Financial Applications in BASIC environment. If you have minimum 3 yrs exp in Software Development and strong interpersonal skills, this opportunity is for you. Fee Paid. Salary to \$30,000

ROBERT HALF of Miami, Inc.
2855 Le Jeune Rd., #814
Coral Gables, FL 33134
(305) 447-1757

SAN FRANCISCO

SR DATA BASE ANALYST

South Bay firm seeks individual w/ 3+ years IMS as DBA. IMS performance tuning (DBDCL), disk management, VSAM & structural system design are required. Will relocate. \$35-45,000

INTERNAL EDP AUDITOR

Company 1 1/2 hours east of San Francisco seeks Auditor w/ financial & operations capability. 3/4 systems & 1/4 acctg. Some systems design on IBM 4341. CIA & CPA +. Will relocate. To \$43,000

SR ANALYST

Peninsula firm seeks individual w/ financial and/or insurance applications in IDMS (3 yrs minimum), COBOL (OS) environment to act as tech consultant on IBM 4341 system. 5-7 yrs exper. Will relocate. \$37,000 midpt

SR P/A

South Bay firm seeks individual w/ 3 yrs COBOL, 1 yr CICS, VM/CMS, DOS/VSE to program for corporate HQ. Focus would be a plus. Need good debugging skills. May pay relocation. To \$36,000

APPLICATIONS MGR / TEAM LEADER

East Bay firm seeks individual w/ min 4-5 yrs HP 3000 w/ COBOL, Basic, Image, Query, VSAM 3000, View 3000 to act as technical specialist - Sr P/A. Will relocate if outstanding. \$35,000+

QUALITY ASSURANCE ANALYST

South Bay firm seeks individual w/ 2-4 yrs software quality assurance and configuration mgmt exper. Software development leadership or exper helpful HP system. Will relocate. \$30-35,000

PROGRAMMER/OPERATOR

Reno firm seeks individual w/ IBM S/34 - RPG II exp to supervise 2 & head department. Conversion to S/36. Great benefits. Will relocate. \$26-30,000

Patricia Brown
ROBERT HALF of Northern California
111 Pine Street, 15th Floor
San Francisco, CA 94111
(415) 434-1900

BOSTON

TECH SVCS DIR

Progressive \$2B firm seeks proven mgr to oversee the S&A & tech support depts. Multi-CPU IBM OS/MVS IMS DB/DC mainframe shop w/ extensive on-line network. Exciting opportunity to manage the tech growth of a dynamic org. \$55,000

IMS TEAM LDR

Super career opportunity awaits the tech skilled proj ldr. A strong bkgd in IBM OS IMS DB/DC COBOL req'd. This Fortune 500 offers hvy admin/tech involvement w/ devel tech support grps. \$35,000

OS/MVS SYS PROG

Progressive firm seeks exp seeks BAL internale pro for challenging knowl in an IBM OS/MVS IMS environ. Upward mobility for the tech specialist. \$35,000

ROBERT HALF of Boston, Inc.

100 Summer Street
Boston, MA 02110
(617) 423-1200

PROVIDENCE

MRP SYSTEM DEVELOPMENT

New sys devel programming w/ COBOL & RPG II on IBM 4331. Sr P/A bkgd w/ strong user interface skills. Will work independently. Rpts to MIS director. \$30,000

ROBERT HALF of Providence, Inc.

78 Westminster St.
Providence, RI 02903
(401) 274-8700

DAYTON

EDP AUDITORS

Growth opportunity available in both mfg & service industries for EDP auditors with 1+ yrs exp. Finl & oper EDP audit exp with good written & oral comm skills. Exp with both prog & audit is best. CPA, CIA, or CISA a +. Salaries DOE

ROBERT HALF of Dayton, Inc.

Box 756, Mid-City Station
Dayton, OH 45402
(513) 224-0600

WASHINGTON

NEW DATA CENTER

First rate financial services co seeks a staff of 20 for a new IBM 4341 shop. COBOL, SAS, SPSS programmer/analyst needed now! To \$33,000

ROBERT HALF of Washington

7316 Wisconsin Ave.
Suite 401
Washington, DC 20814
(301) 852-1960

WESTERN MICHIGAN

SOFTWARE SPECIALISTS

Progressive companies offer 3 tech careers. Senior MVS person for leadership role in conversion. To \$40,000
Promotable tech specialists, MVS preferred, AC/VTAM accepted. To \$37,000
DOS/VSE or VSE staff position, will train person with 1-2 years sysops. \$25-30,000

Joe Grabinski

ROBERT HALF of Western Michigan, Inc.
Suite 302, 180 Division N.
Grand Rapids, MI 49503
(616) 458-2333

HARTFORD

MVS SYS PROG

Career opportunity for MVS-XA exp'd sys prog to join staff of growing ind co. Excellent benefits, suburban loc. Full reloc. \$30-38,000

VM SPECIALIST

Indiv with VM exp, internale & perf bkgd req'd to assume lead role in multi sys expanding in 1984. \$32-42,000

IMS DB/DC

Outstanding opportunity for indiv with DB/DC. Must have exp in logical/physical data base design & strong tech skills. Suburban loc, many extras. \$36-45,000

DATA BASE (IMS or IDMS)

New pos in sm prg to formulate data base design, modeling & architecture for long-range corp planning. 3 yrs exp in data base qualifies for this invisible staff pos. \$32-38,000

PERF SPEC

Lge IBM D/C seeks sr indiv to direct all perf/cap planning activities for multi-div corp. State-of-the-art shop with aggressive 1984 expansion plans. \$32-38,000

DP MANAGER

Multi div corp seeks exp'd degreed indiv to manage data cns, tech & opns staff. Exc growth pot. S/38 exp a plus. \$50-60,000

DEC/VAX

3+ yrs DEC/VAX or 11/70 exp req'd for 1984 expansion opportunity with hi-tech co. Work on corp on-line dev sys. Exc benefits, suburban loc. \$30-40,000

ROBERT HALF of Hartford, Inc.

111 Pearl Street
Hartford, CT 01603
(203) 278-7170

BUFFALO

SR ANALYST/PROG

Major WNY fin'l org w/ rapidly growing IBM sys & prog dept want to hire several analysts & programmers to devel & support corp fin'l apps. Req min 3 yrs exp & knowl of COBOL & CICS. Pref exp in IDMS, IMS & HOGAN sys. Fantastic opportunity to join successful bus w/ sophisticated data sys plans. To \$33,000

ROBERT HALF of Buffalo, Inc.

1310 Liberty Bldg.
Buffalo, NY 14202
(716) 842-0801

NEW ORLEANS

SR SYSTEMS ANALYSTS

Mfg &/or fin systems apps. IBM mainframe ideal w/ 2 yrs of app sys design & development exp. IMS/DB/DC a plus. \$42,000

SR PROGRAMMER ANALYSTS

Several yrs COBOL exp on IBM mainframe working w/ structured programming techniques. On-line, IMS/DC are pluses. \$42,000

SYSTEMS PROGRAMMERS

Several yrs managing operating systems, software support & disk space finetuning IBM mainframe, DOS, Syseng. \$30,000

ROBERT HALF of New Orleans

P.O. Box 57629
New Orleans, LA 70157
(504) 835-4296

MILWAUKEE

SOFTWARE PROGRAMMER

Huge financial services firm seeks person to handle conversion to MVS. Will be key decision-maker in bringing staff to state-of-the-art technology. Communications experience a plus. To \$48,000

CONSULTANT

Opportunity to work dynamically with variety of environments. Seeks COBOL or RPG with 2+ years high-level experience. Enjoy the varied exposure of high-visibility, top-salary consulting world. \$21-38,000

Brian Krueger or Dick Bird

ROBERT HALF of Wisconsin
777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-1411 (271-4253)

AUSTIN

ENGINEERING DATA BASE MANAGER

Five to ten years exp in scientific or engineering environment. Strong Codesyl at data base and CAD exp essential. To \$50,000

LIFE INSURANCE EXPERTS

COBOL or Assembler language IBM mainframe exp. Multiple openings. To \$35,000

SYSTEMS PROGRAMMERS

OS/MVS or DOS/VSE exp. CICS, VTAM, NCP and VM a big plus. To \$40,000

John P. O'Keefe

ROBERT HALF of Austin, Inc.
400 E. Anderson #334
Austin, TX 78752
(512) 835-0863

SAN ANTONIO

SR SYSTEMS ANALYST

Degree preferred - not req'd. Must have 5+ yrs exp with IBM Series 1, EDX, RPS. Audio responses - PC exposure a PLUS. This position is an overview of department - studying the effect applied to company need. Very visible and exciting. Exceptional benefits. \$29-32,000+

NETWORK ANALYST

Degree preferred. 5+ yrs in Technical Support capacity. IBM 3705, SNF, VTAM, Gens/Dumps, Dataset analyst, transmission design. Company is expanding - converting from Burroughs to IBM 43XX, OS, CICS, etc. Potential of position is only limited by you. \$30-33,000+

DP MANAGER

Degree req'd. Most is Sys 38 - RPG III, total design and start-up sequence. Able to hire, analyze, manage and overall be a working mgr. Apple are Distr/Retail/Wholesale. Position is in Central Texas - beautiful and quiet. Department scheduled to be 7-10 people by 1985. \$40,000

All positions above and many more are in Texas where "Long Necks," "Armadillo" and the "Cotton Eyed Joe" call home.

Bob Baldwin

ROBERT HALF of San Antonio, Inc.
8243 IH 10 West, Suite 850
San Antonio, TX 78201
1-800-531-5402
In TX dial (512) 738-2487

POSITION ANNOUNCEMENTS

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Data Processing

SAUDI ARABIA

SYSOEX INTERNATIONAL, a California Corporation and a rapidly growing systems management company now developing innovative multi-technology systems in Saudi Arabia has the following challenging positions:

SR. DATABASE DESIGNER

BS required with 6-10 yrs. experience in business applications; possesses in-depth experience with database management systems; understands fundamental cost/performance tradeoffs between various physical organizations possible in database management systems; has a sound working understanding of Structured System Analysis and Design tools, including Data Flow Diagrams, logical data analysis, logic tools, transform and transaction analysis, etc., comfortable working in "team" environment.

QUALITY ASSURANCE PROGRAMMER

Bachelor's degree required with 4-6 yrs. data processing experience which includes application design, program development, systems library administration, development and documentation of standards, and usage of databases and data dictionaries.

Training in a structured methodology of system development and installation, top-down testing of systems, application design and programming, and system library management.

SR. DATABASE/Dictionary SPECIALIST

Bachelor's degree required with 6-10 yrs. data processing work experience which includes: a minimum of 1 year specific experience using the DATAMANAGER product, systems analysis and design, program development, development and documentation of standards, database administration, and data dictionary management.

Training in database management systems, structured methodology of system development, integrated data dictionaries, file access methods, data security and control, data analysis/normalization, data modeling, and performance tuning.

MVS SYSTEMS PROGRAMMER

BS in Computer Science or equivalent curriculum required. Minimum 4 yrs. experience as a MVS systems programmer. Responsible for SYSGEN and application of systems maintenance. Knowledge of VM and VS1 a plus.

We offer an excellent benefit package including: medical, life, accidental death, disability and profit sharing plans. You will additionally receive 25 working days vacation, 15 holidays, free furnished housing, annual return home travel, paid relocation expenses, plus eligibility for present Federal Income Tax exclusions.

Please send resume, INDICATING POSITION TITLE FOR WHICH YOU ARE APPLYING, with present salary to Personnel Dept. CW-2/6, SYSOEX INTERNATIONAL, INC., 10590 N. Tantau Avenue, Cupertino, CA 95014. U.S. CITIZENSHIP REQUIRED. INDIVIDUALS ONLY APPLY.

SYSOEX

Sysorex International Inc.

System Developers
800-231-5920

Inviting resumes from individuals in the more highly technical computer related vocations such as: PHD Computer Scientists, Operating System Developers, Data Base Developers, Porting Specialists, Networks and Telecommunications, Architecture, Artificial Intelligence, Graphics Systems Developers, Microcoders and Firmware Developers, Compiler Development, etc. Special interest in emerging technology such as novel architecture, UNIX, AIX, etc. Similar interest in scientific applications developers including military, process control, data acquisition, telemetry and communications, CAD/CAM, simulation and modeling, etc.—we are a professional employment firm managed by graduate engineers. Fees are paid by the employer. All geographic locations. Send resume or call D.A. Redwine and ask for our free resume workbook & career planner.



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Computer Science Degree
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Working knowledge of Burroughs and Tandem systems
COBOL, ASSEMBLER, TAL language experience

Duties include staff administration; evaluation, installation and support of all system software and hardware.

SOFTWARE SPECIALIST, TECHNICAL SUPPORT

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Working knowledge of Burroughs or Tandem systems
COBOL, ASSEMBLER, TAL language experience

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SENIOR INFORMATION SYSTEMS PLANNING ANALYST \$2801 Per Month Tax Free*

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COMPUTER PROFESSIONALS

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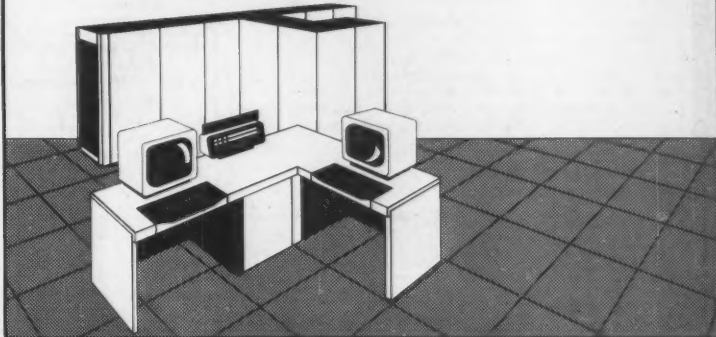
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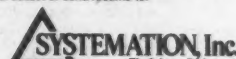
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Applicants should have 2-3 years experience in system programming and a Degree in Computer Science. Will have primary responsibility for the generation, maintenance and tuning of the VM and DOS/VSE operating systems on IBM 4381 and 4341 mainframe hardware. Must have knowledge in CICS and assembler language. Excellent benefits and salary. Send resume and salary history by February 13th to:

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St. Louis based travel company is expanding the data processing department. Seeking two System 38 Programmers/Analysts with minimum of 1-2 years experience in the design and coding of RPG II programs. Good benefits, pleasant working conditions and a chance to grow with an expanding company. Send resume and salary history to:

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Grant Cooper and Associates
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Exceptional career opportunities for Information Systems Professionals exist at our divisional office in Ypsilanti, Michigan. This rapidly growing division is looking for high potential candidates to fill immediate openings. Opportunities exist for:

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Successful candidates will have 3-5 years experience in writing PL1 programs in IMS DB/DC environment. Knowledge of CMS is desirable.

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Successful candidates will have 3-5 years experience in software support of IBM Systems. Candidates should have a working familiarity with the internal MVS, JES2 and MVS program products. Previous experience in performance tuning is highly desirable.

Software Systems Programmer

Successful candidates will have 3-5 years experience in support of IBM Systems. Candidates should have a working knowledge of CICS, VTAM and MVS program products.

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Successful candidates will be experienced in generating and support of IBM SNA Communications Software. Candidates should also have a working familiarity with the internals of VTAM and NCP.

Candidates should have a bachelor's degree in a related field. Salary for these positions will be commensurate with your experience and education.

If you believe you qualify for any of these positions and wish to discuss them with us submit your resume and salary requirements in confidence to:

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Salaried Personnel
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Ypsilanti, Michigan 48197

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The California Institute of Technology, renowned as a center of education and research of the highest caliber, is seeking experienced professionals to fill the following positions:

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Working closely with other concerned members of the campus community, this individual will identify, design and implement software systems at Caltech. This will include project management, continuous review of developments in local area networking and operating systems, supervision and/or project implementation, promotion of the initial release of new products, and supervision of the development of documentation and seminars, as required. This senior-level position requires a Bachelor's in Computer Science or related field plus at least 5 years of appropriate experience or, preferably, a PhD. A demonstrated knowledge of modern operating systems, programming languages, software architecture and software management is also required.

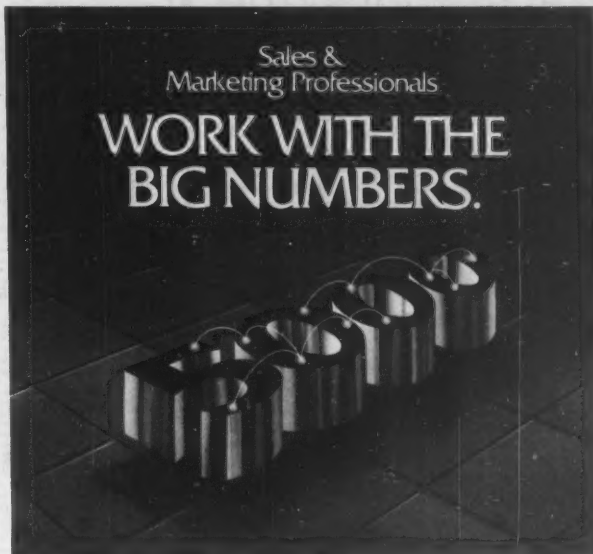
Educational Computing Project Leader

Reporting to the Dean for Educational Computing, this individual will coordinate the integration of computers into the Caltech curriculum. In doing so, this individual will provide advice and technical support on the hardware and systems software of various equipment used in educational computing; supervise and/or author various software projects, especially the necessary graphics packages needed in the broad scientific education provided by Caltech; review, in detail, developments in networking, graphics, databases and other relevant packages developed by groups at Caltech and JPL; and maintain a broad understanding of overall developments in this field. This position requires a broad knowledge of modern computer hardware and software, as well as an expertise or interest in scientific application programming. In addition, a Bachelor's or equivalent in both Computer Science and another science, along with the ability to manage software projects and supervise students, is required.

Both positions require individuals with excellent oral and written communication skills, as well as the ability to work independently. For consideration, please send a resume with salary requirement to: Supervisor of Employment, CALTECH, Pasadena, CA 91125. Equal Opportunity Employer M/F



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Positions require experience with documenting computer procedures, writing administrative procedures, developing program specifications, designing application systems and project scheduling when planning the development of a new project. Also requires background as a project leader and experience making presentations to users and/or management.

Salary range is \$23,396 to \$31,352 (negotiable) plus good fringe benefits program. For application forms, contact: Joan Bronson, Health & Welfare Personnel, 450 W. State, Boise, Idaho 83720 or call (208) 334-4086. Please reply to advertisement by February 15, 1984.

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Include in your resume emphasis on Software A.G. products and your specific involvement. Also provide details of operating systems utilized and other vendor products (DB/DC area) which you are familiar with.

Closing date is February 20. Include telephone number(s) and best time to contact. Send resumes and salary history to:

Dennis Fleming

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Aerojet ElectroSystems, a high-tech company, has immediate openings in its Telecommunications organization for:

COMMUNICATIONS SOFTWARE PROJECT SPECIALIST

Develop monitoring and control software for network management on a broad-band Local Area Network. Will be responsible for coordinating software implementations on the IBM 3033, VAX 11-780 using higher-level protocols among the various computing resources.

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Interested applicants wanting to join our fast growing team should have maintenance experience in one of the following areas:

1. Field service experience on Data General based systems.
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Forward Resume to:

Fortune

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The University of Southern Colorado is a public university has openings for department head and tenure track faculty positions. Qualifications: Ph.D. in Computer Science and closely related field, significant teaching and industry experience, consulting, and research. Faculty positions require M.S. degree, Ph.D. is preferred. The department has a triple option B.S. program oriented toward DPM, ACM, or electronics curricula. Areas of teaching include D.P., Pascal, Ops. Sys., Syst. Anal., AL, Cobol and, DBMS, Data Struct., Comp. Arch., Microprocessors, Graphics, D.P. Management, Programming Languages. Opportunities exist for undergraduate and graduate course development and research. An optional sabbatical leave is available in one position. Pueblo is a sun-belt community located beside the Rocky Mountains. Housed for abundant recreational and cultural activities. High quality of life. The University has 5,000 students (800 CST matric.) Send resume and references by March 15, 1984 to:

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Harris Helps You Make The Most Of Your Ability

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Professional with expertise in peripheral products will coordinate the peripheral product line from market requirement or production inception through introduction initial sales or enhancements to product termination. Minimum Technical Bachelor's degree and 4 plus years peripherals experience in product design, testing, integration, or product management.

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Immediate openings for Systems Software Developers with a BS or MS in Computer Science and development experience in one of the following:

- Compiler Development
- Data Communications, specifically network and standard protocol implementation

We offer attractive salaries together with comprehensive benefits. For further information, please submit resume, in confidence to Jan Jeter, Personnel Department, HARRIS COMPUTER SYSTEMS DIVISION, 2101 West Cypress Creek Road, Fort Lauderdale, FL 33309-1892.



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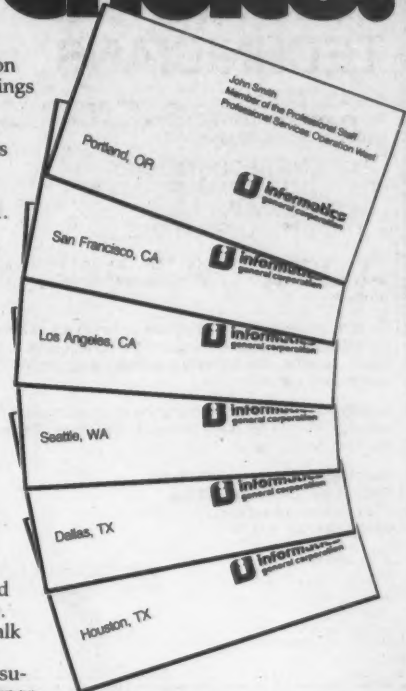
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Sandia National Laboratories

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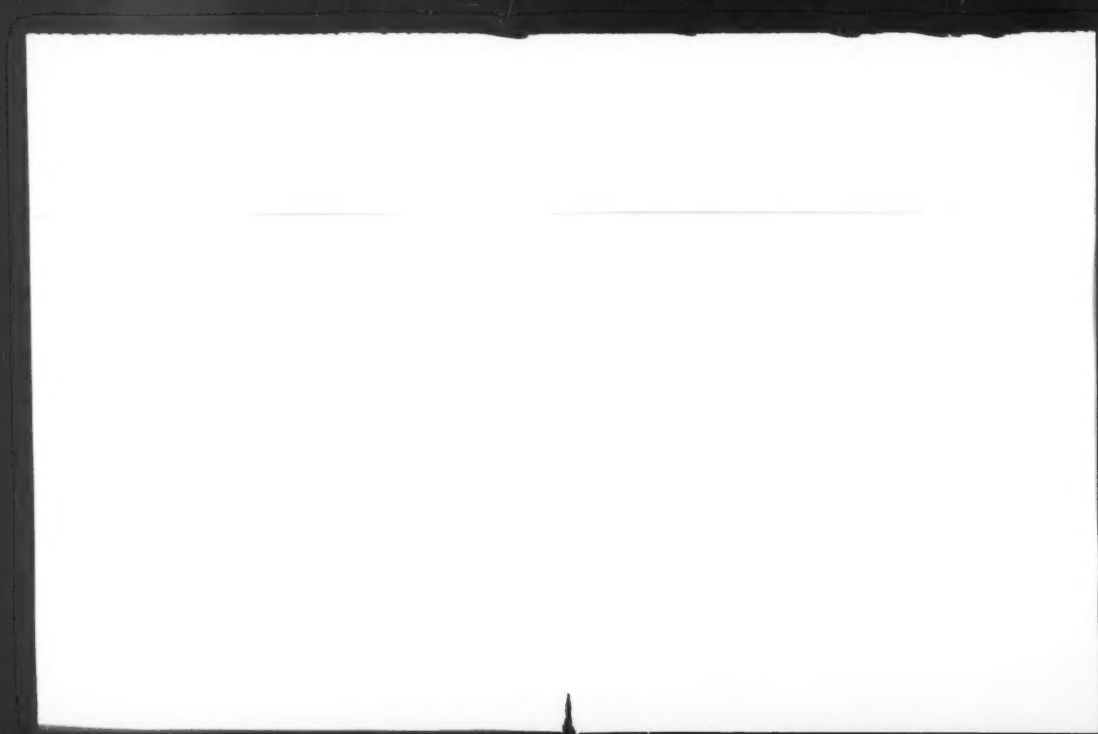
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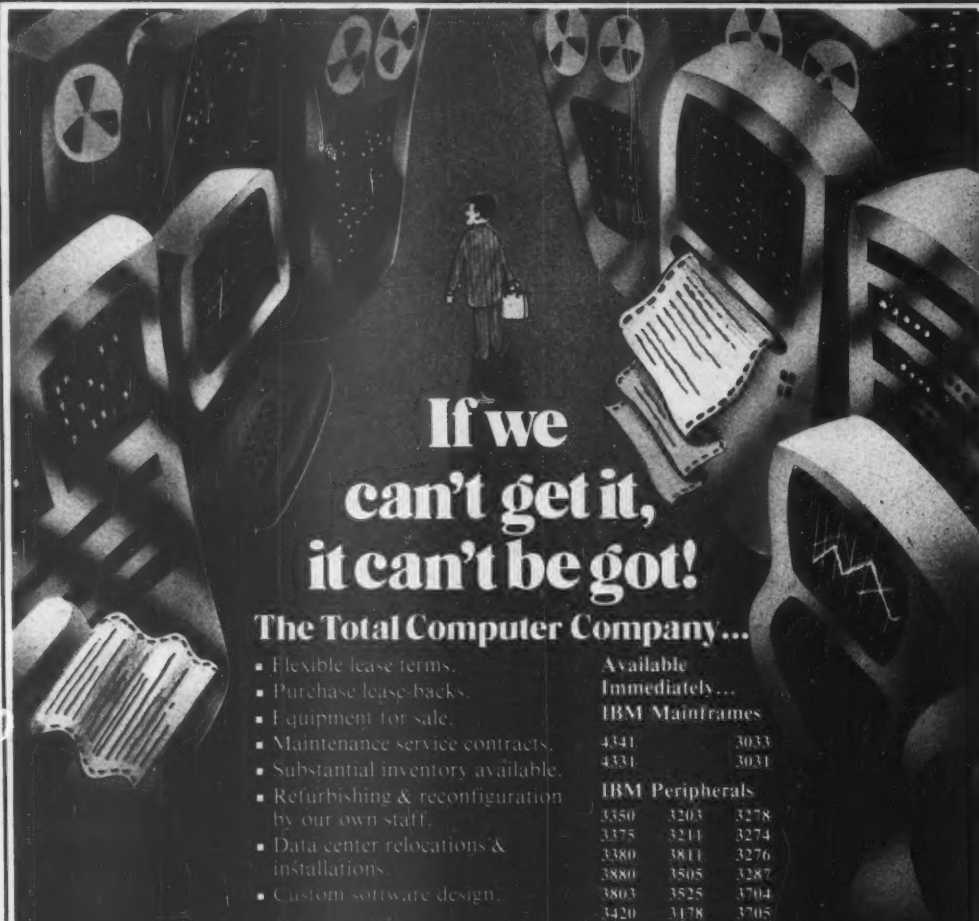
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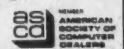
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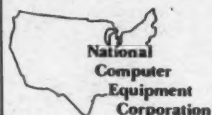
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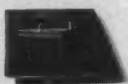
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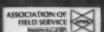
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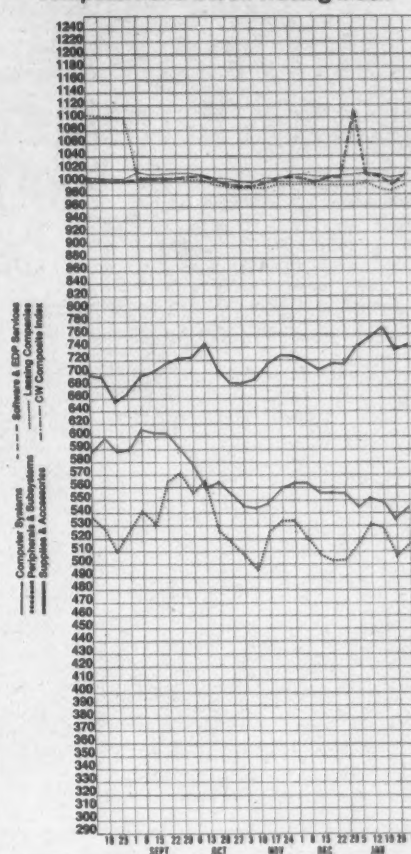
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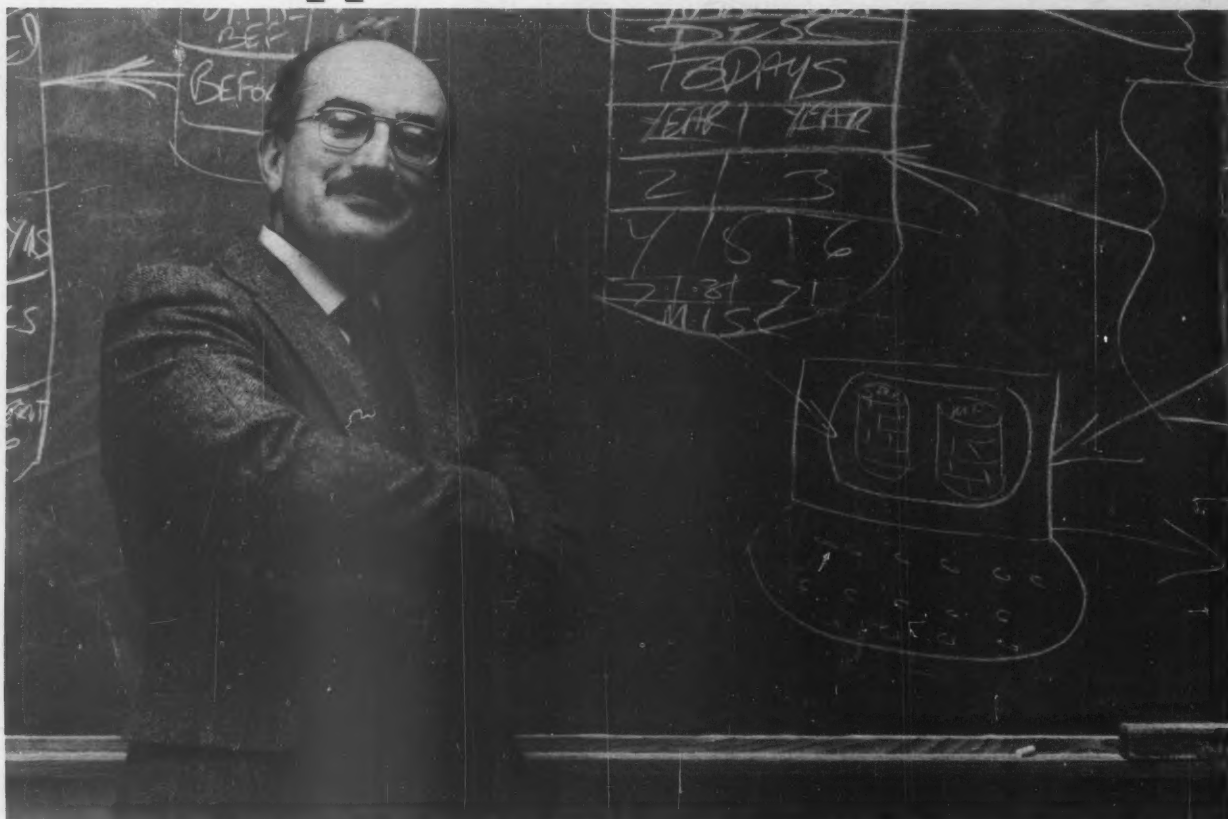
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(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
COMPUTER SYSTEMS														
D ALPHA MICROSYSTEMS	11-24	13 3/4	-3/4	-1.1	D ADVANCED COMP TECH	1-8	3 3/4	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D ALTOX COMPUTER SYST	8-28	10 1/2	-3/4	-0.8	D ADVANCED SYSTEMS INC	6-27	17 1/4	-3 1/4	-11.9	D BARRY MICRO	1-12	1 1/2	0	0.0
D AMERICAN CORP	9-30	16 3/8	0	0.0	D AMERICAN SYSTEMS INC	7-21	28 1/4	-3	-10.2	D BARRY MICRO	1-12	1 1/2	0	0.0
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D AT&T	80-70	88 3/4	0	0.0	D ANALYSTS INTL CORP	8-23	9 3/4	-1 1/2	-9.0	D BARRY MICRO	1-12	1 1/2	0	0.0
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D BARRONS CORP	8-16	13 1/2	-1/8	-0.8	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	9-15	8 7/8	-1 1/2	-17.8	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	10-15	12 1/8	-1 1/8	-6.3	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	22-47	24 3/4	-1 1/8	-6.3	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	3-18	13 1/8	-1 1/8	-6.3	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	26-44	31 7/8	-2 1/4	-6.3	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
SOFTWARE & ERP SERVICES														
D BARRONS CORP	20-91	38 3/4	-2 1/2	-6.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	22-48	40	-2 1/8	-9.0	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	80-138	138 3/4	-3 1/4	-9.6	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	87-124	112 3/4	-1 5/8	-1.4	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	5-14	3 1/2	-1 1/2	-10.0	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	17-35	17 1/4	-1 1/2	-12.8	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	1-1	5 3/8	0	0.0	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	3-23	22 3/8	+1/2	+2.2	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	47-88	82 1/4	+1 1/8	+1.3	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	8-16	6 3/8	-5/8	-6.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	10-18	14 7/8	0	0.0	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	80-148	137 1/2	-8 3/4	-15.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	14-80	16 1/2	-1 1/2	-13.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	21-51	22 1/8	-3/8	-10.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	39-138	117 1/4	-1 1/2	-3.6	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	17-37	22 3/8	-1 1/2	-6.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	11-30	17 7/8	-1 1/4	-6.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	21-50	45 1/4	-1 1/2	-3.2	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	14-40	22 3/8	-3 1/8	-6.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	34-85	24 7/8	-1 1/4	-6.4	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
PERIPHERALS & SUBSYSTEMS														
D BARRONS CORP	13-41	13 1/8	-1 1/4	-6.6	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	8-18	11 1/2	-3 1/4	-6.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	71-176	127	-9 1/4	-9.7	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	24-14	17 1/4	-1 1/4	-8.9	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	2-14	2 1/2	-1 1/4	-9.2	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	13-42	30 1/8	-1 1/2	-4.7	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	11-42	30	-1 1/2	-4.7	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	35-52	42 1/4	-6 1/2	-13.3	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
SUPPLIES & ACCESSORIES														
D BARRONS CORP	11-37	35 1/4	-1 1/4	-9.7	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	7-42	11 1/4	-2 3/8	-12.4	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	3-18	18	-1 1/2	-6.8	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	3-18	13 3/8	-3/8	-2.7	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0
D BARRONS CORP	18-47	35 3/8	-1 1/4	-2.7	D BARRONS CORP	1-7	7 3/8	0	0.0	D BARRY MICRO	1-12	1 1/2	0	0.0

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